Finlay Community School

Science

Our Whole School Curriculum Intent

At Finlay, we aim to teach a broad and balanced curriculum that enables children to enjoy, achieve and succeed in line with the National Curriculum. We provide opportunities to develop the children's cultural capital and ensure they are life-long learners, who are ready for the next step of the education and to thrive in Society. In addition to teaching the National Curriculum, we also aim for our children to leave school with a SMILE! Our SMILE values are: social awareness, mental health and wellbeing, independence, life skills and excellent aspirations. We provide opportunities to develop these values in all curriculum areas.

Our Science Intent

At Finlay, we teach the National Curriculum. As mentioned in the National Curriculum, high quality Science teaching should 'provide the foundations for understanding the world' and is 'vital to the world's future prosperity'. It should encourage children to recognize the power of rational explanation and enable then to develop a sense of excitement and curiosity about natural phenomena. Teaching should provide opportunities for pupils to undertake scientific enquiries to answer relevant scientific questions and develop an extensive specialist vocabulary. Science teaching at Finlay aims to provide children with an understanding of the natural and humanly constructed world around them, what is occurring and predict how things will behave and analyse the causes. We feel this ties in closely with you 'SMILE' values as pupils learn more about the reasons for the world bring the way it is and are equipped with the knowledge, skills and understanding to foster excellent future aspirations.

Whole School Curriculum Overview: Science Units

Reception

Year 1

A1: Everyday materials
A2: Everyday materials
Sp1: Understanding Plants
Sp2: Animals including humans
S1: Seasonal Changes
S2: Everyday materials (revisit)

Year 2

A1: Everyday materials
A2: Everyday materials
Sp1: Living things and their habitats
Sp2: Understanding plants
S1: Animals including humans
S2: Animals including humans

Year 3

A1: Animals including humans
A2: Light
Sp1: Rocks
Sp2: Forces and magnets
S1: Understanding plants
S2: Understanding plants

Year 4

A1: Animals including humans - digestive system and teeth
A2: Electricity
Sp1: Sound
Sp2: States of matter/Reversible and irreversible changes
S1: Living things and their habitats - classification
S2: Animals including humans - food chains

Year 5

A1: States of matter/ Reversible and irreversible changes
A2: Earth and Space
Sp1: Forces and Magnets
Sp2: Living things and their habitats/ understanding plants
S1: States of matter
S2: Animals including humans

Year 6

A1: Animals including humans
A2: Light
Sp1: Electricity
Sp2: Living things and their habitats
S1: Evolution and Inheritance
S2: Evolution and Inheritance

Science Coverage Term by Term (EYFS – Year 6)

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	It's Good to be Me	Let's Celebrate	Once Upon a Time		Are we nearly there yet?	Moving on up!
Year 1	Finlay Toy Factory		Where oh Where is Finlay Bear		The Great Space Race	
	Everyday materials Chemistry	Everyday materials Chemistry	Understanding Plants Biology	Animals including Humans Biology	Seasonal Changes Physics	Everyday materials Chemistry
Year 2	Heroes in History Florence Nightingale and Mary Seacole		Around the World in ... Days Passport theme		The Great Fire of London & The Tudors	
	Chemistry	Chemistry	Biology	Biology	Biology	Biology
Year 3	Rock and Roll! Stone Age and Iron Age		Deadly Disasters		Navigating the Nile/ Ancient Egyptians	
	Animals including Humans Biology	Light Physics	Everyday material Chemistry	Forces and Magnets Physics	Understanding Plants Biology	Understanding Plants Biology

Year 4	Rotten Romans Glorious Glevum		Journey to the River Sea! Come Sail with Me!		Ancient Greeks Olympics	
	Animals including Humans Biology	Electricity Physics	Sound Physics	States of matter/ Reversible and Irreversible changes Chemistry	Living things and their Habitats Biology	Animals including Humans Biology
Year 5	Chocolate! Ancient Maya		Deforestation The Rainforest – North and South America		Invaders and Settlers – Saxons, Vikings and Mayans	
	States of matter/ Reversible and Irreversible changes Chemistry	Earth and Space Physics	Forces and Magnets Physics	Living things and their Habitats/ Understanding plants Biology	States of matter / Reversible and Irreversible changes Chemistry	Animals including Humans Biology
Year 6	We'll Meet Again! World War 2		Ice Explorer Arctic and Antarctica		Let Me Entertain You! History of Entertainment	
	Animals including Humans Biology	Light Physics	Electricity Chemistry	Living things and their Habitats Biology	Evolution and Inheritance Biology	Evolution and Inheritance Biology

Science Key Vocabulary Term by Term (EYFS – Year 6)

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	It's Good to be Me	Let's Celebrate	Once Upon a Time		Are we nearly there yet?	Moving on up!
Language will be taught to support learning	Head, body, eyes, ears, mouth, teeth, leg, Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue	tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves	Plants : Leaf, flower, petal, fruit, berry, root, seed, stem, stalk, bud Places: hot/ cold, environment, beach, seaside, forest, house, cottage, woods, forest – links to fairytales and home environments		Hard, soft, plastic, wood, push, pull. Float, sink, turn, loud, quiet, on, off,	See Autumn Term
Year 1	Finlay Toy Factory		Where oh Where is Finlay Bear		The Great Space Race	
	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through		Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud	Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue Names of animals experienced first hand	Weather (sunny, rainy, windy, snowy etc.) Seasons (winter, summer, spring, autumn) Sun, sunrise, sunset, day length	See Autumn Term

Year 2	Heroes in History Florence Nightingale and Mary Seacole		Around the World in ... Days Passport theme		The Great Fire of London & The Tudors
	Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials Y1 - Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through Plus opaque, transparent and translucent, reflective, nonreflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching		Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc.	Y1 - Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Plus light, shade, sun, warm, cool, water, grow, healthy	Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)
Year 3	**Rock and Roll! Stone Age and Iron Age**		**Deadly Disasters**		**Navigating the Nile/ Ancient Egyptians**
	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine	Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous	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	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	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)

Year 4	Rotten Romans Glorious Glevum		Journey to the River Sea! Come Sail with Me!		Ancient Greeks Olympics	
	Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars	Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol	Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation	Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle	Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	herbivore, carnivore, omnivore, producer, predator, prey, food chain
Year 5	Chocolate! Ancient Maya		Deforestation The Rainforest – North and South America		Invaders and Settlers – Saxons, Vikings and Mayans	
	Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets	Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	See Autumn 1	Puberty – the vocabulary to describe sexual characteristics
Year 6	We'll Meet Again! World War 2		Ice Explorer Arctic and Antarctica		Let Me Entertain You! History of Entertainment	
	Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon	Y3 - Light, light source, dark, absence of light, transparent, translucent, opaque,	Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery,	Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates,	Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils	

	dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle Com	shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, plus straight lines, light rays	bulb, buzzer, motor, switch, voltage	insects, spiders, snails, worms, flowering, non-flowering	

Progression of Knowledge, Skills and Understanding in the National Curriculum

Science – Working Scientifically

		Pre-school and Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Planning Scientifically	Asking Questions		Ask simple questions and recognising that they can be answered in different ways.	Ask simple questions and recognise that they can be answered in different ways including the use of scientific language from the National Curriculum.	Begin asking relevant questions and experiment with different types of scientific enquiries to answer them,	Ask relevant questions and use different types of scientific enquiries to answer them.	Ask relevant questions to explore scientific contexts further, choosing which type of scientific enquiries to answer them.	Ask relevant questions to futher their own scientific understanding in a range of contexts, choosing and justifying which type of scientific enquiry is best to answer them.

Planning Scientifically	**Planning a Scientific Enquiry**		Perform simple tests.	Perform simple and comparative tests.	Begin to set up simple practical enquiries, comparative and fair tests.	Set up simple practical enquiries, comparative and fair tests, understanding this is important to draw accurate conclusions.	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling independent and dependent variables.
Observing Scientifically	**Observations**		Make observations using appropriate senses and simple equipment (magnifying glasses and timers).	Use simple equipment to observe closely, including changes over time.	Make systematic and careful observations.	Make systematic and careful observations and comparisons of relevant features in a variety of contexts.	Decide what to observe/compare, how long to observe for and whether to repeat observations.	Decide what to observe/compare, the duration of observation and whether repeated observations are needed, justifying my reasons why using my scientific understanding.
Observing Scientifically	**Using measurements**		Use non-standard units of measure to collect data.	Use non-standard units of measure and begin to experiment using standard units of measure to collect data.	Take measurements using standard units using a range of equipment including: data loggers and themometers.	Take accurate measurements using standard units using a range of equipment including: data loggers and themometers.	Take accurate measurements using a range of scientific equipment with increasing accuracy and precision, taking repeated readings where necessary.	Take accurate measurements, choosing which scientific equipment to use, with increasing accuracy and precision, taking repeated readings where necessary to identify anomalies.

Gather and record Scientifically	Gathering and recording data		Gather and record data using pictures, block graphs or tally charts to help in answering questions as a class.	Gather and record observations using tables, drawings, block graphs and some written data to help in answering questions, including from secondary sources of information as a group.	Gather and record findings using simple scientific langauge, drawing , labelled diagrams, charts and tables with increasing independence.	Gather and record findings using simple scientific langauge, drawing , labelled diagrams, charts and tables independently, ensuring they are accurate.	Gather and record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	Select the most appropriate method of gathering and recording data and results of increasing complexity: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Concluding Scientifically	Reportings on findings		Use his/her observations and ideas to suggest answers to questions and whether this was what they expected.	Use his/her observations and ideas to suggest answers to questions.	Use his/her own results and scientific evidence to draw simple conclusions, and answer questions.	Draw scientific conclusions and answer questions using their own results and evidence to support this.	Use scientific enquiries, own subject knowledge and experiences to draw their own conclusions, which can be fully supported with data and evidence.	Use scientific enquiries, detailed subject knowledge and a range of experiences to draw their own detailed conclusion, which can be fully supported and justified through the use of data and gathered evidence, ruling out anomalies.
Concluding Scientifically	Finding similarities, differences and relationships between.			Notice similarities, differences and patterns.	Identify differences, similarities or changes related to simple scientific ideas and processes.	Identify simple trends and patterns related to simple scientific ideas and processes.	Begin to identify causal relationships and explanations of the degree of trust in results.	Confidently identify causal relationships and explanations of the degree of trust in results, explaining the impact that this has.

Concluding Scientifically	*Presenting findings*		Begin to present some findings orally, in simple tables and block graphs using ICT where relevant.	Present findings from collaborative data orally, using tables, drawings or block graphs. Continue to use ICT where relevant.	Begin to present findings from enquiries using age-appropriate scientific language, drawings, labelled diagrams, keys, bar charts, tables and ICT where appropriate.	Present findings from enquiries using age-appropriate scientific language, drawings, labelled diagrams, keys, bar charts, tables and ICT where appropriate.	Begin to present findings from scientific enquiries of increasing complexity using scientific diagrams and labels, classification keys, tables, scattergraphs, bar and line graphs, written explanations and presentations. Continue to use ICT where it enhances the presentation of findings.	Confidently present findings from scientific enquiries of increasing complexity using scientific diagrams and labels, classification keys, tables, scattergraphs, bar and line graphs, written explanations and presentations. Continue to use ICT where it enhances the presentation of findings.
Evaluating Scientifically	**Evaluating Scientifically**			Identify what was successful in my investigation and suggest changes for the future.	Make predictions for new values using recording data, suggest some improvements for future investigations and potentially raise further questions.	Make predictions for new values using recording data, suggest well thought-out improvements for future investigations, which can be explained fully and raise further questions.	Use test results to make predictions to set up further comparative and fair tests.	Confidently use test results to make predictions for new values, justifying these fully. Use this information to independently set up further comparative and fair tests to find out more.
Evaluating Scientifically	**Refuting or supporting scientific claims**						Identify scientific evidence that has been used to support or refute ideas and arguments.	Identify scientific evidence from their own enquiries or other people's scientific ideas (including those that have changed over time) and use these to support or refute ideas and arguments.

Science -Biology

		Pre-school and Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Understanding Plants	Types of plants and flowers. Specific parts of plants and flowers		Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.	Observe and describe how seeds and bulbs grow into mature plants.	Identify, locate and describe the functions of different parts of flowering plants (roots, stem/trunk, leaves and flowers).			
Understanding Plants	How plants grow		Identify and describe the basic structure (at least: flower, leaf, root, stem, trunk, seed, branch and petal) of a variety of common flowering plants, including deciduous and evergreen trees .	Find out and describe how plants need water, light and a suitable temperature to stay and grow healthily and how changing these effect the plant.	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.			

Understanding Plants	Seed dispersal and reproduction				Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.		Name, locate and describe the main parts of the reproductive system of plants: stigma, stamen, petal, sepal, pollen and ovary, (covered in living things and their habitats)	
Understanding Plants	Seed dispersal and reproduction			Know that plants are living and eventually die.	Investigate the way in which water is transported within plants			
Animals including Humans	Identifying and naming animals. Recognising that animals and humans change.		Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.	Understand that animals, including humans, have offspring which grow into adults.			Describe the changes as humans develop to old age.	

Animals including Humans	Identifying and naming animals. Recognising that animals and humans change.		Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)			Construct and interpret a variety of food chains, identifying producers, predators and prey.		
Animals including Humans	Nutrition		Identify and name a variety of common animals that are carnivores, herbivores and omnivores.	Describe the basic needs of animals including humans for survival (water, food and air)	Identify that animals, including humans, need the right types of nutrition, and that they cannot make their own food. They get nutrition from what they eat.			Describe the ways in which nutrients and water are transported within animals, including humans.

Animals including Humans	Healthy lifestyle and exercise			Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.		Identify the different types of teeth in humans and their simple functions.		Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
Animals including Humans	The Human Body		Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.		Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Describe that simple functions of the basic parts of the digestive system in humans.		Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
Living things and their habitats	Explore, compare, describe and classify living things.			Explore and compare differences between things that are living, dead, and things that have never been alive.		Recognise that living things can be grouped in a variety of ways.	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	Describe how things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.

Living things and their habitats	Explore, compare, describe and classify living things.			Identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs.		Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.	Describe the life process of reproduction in some plants and animals.	Give reasons for classifying plants and animals based on specific characteristics.
Living things and their habitats	Explore, compare, describe and classify living things.			Identify and name a variety of plants and animals in their habitats, including micro-habitats.		Recognise that environments can change and that this can sometimes pose dangers to living things.	Name, locate and describe the main parts of the reproductive system of plants: stigma, stamen, petal, sepal, pollen and ovary,	
Living things and their habitats	Explore, compare, describe and classify living things.			Describe how animals obtain their food from plants and other animals, using the ideas of a simple food chain, and identify and name different				

				sources of food.					
Evolution and Inheritance	Understand that living things have changed over time							Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	
Evolution and Inheritance	Understand that living things produce offspring.							Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.	
Evolution and Inheritance	Understand how animals and plants are adapted and that this can lead to evolution							Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	

Science – Chemistry

		Pre-school and Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Everyday Materials	Compare, group and classify materials		Distinguish between an object and the material from which it is made.					
Everyday Materials	Compare, group and classify materials		Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.	Identify and compare the suitability of a variety of everyday materials, including woods, metal, plastic, glass etc. for particular uses.			Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets	
Everyday Materials	Compare, group and classify materials		Compare and group together a variety of everyday materials on the basis of their simple physical properties.					

Everyday Materials	Decribe the properties and uses of materials		Describe the simple physical properties of a variety of everyday materials.	Find out how shapes of solid objects made from materials can be changed by squashing, bending, twisting and stretching.			Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, inlcuding metals, woods and plastics.	
Rocks	Compare and group Rocks				Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.			
Rocks	Describe how fossils were formed				Desrcibe in simple terms how fossils are formed when things that have lived are trapped within rocks.			
Rocks	Understand how soil is made				Recognise that soils are made from rocks and organic matter.			
States of Matter/Reversible and	Compare and group materials					Compare and group materials together, according to whether they are solid, liquid or gas.		

States of Matter/Reversible and Irreversible Changes	Changing State and sorting materials					Observe that some materials change state when they heated or cooled ans measure or research the temperature at which this happens in degrees celcius.	Use a knowledge of solids, liquids and gases to decide how mixtures might be seperated, including through filtering, sieving and evaporating.	
States of Matter/Reversible and Irreversible	Changing State and sorting materials					Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.		
States of Matter/Reversible and	Reversible and irreversible changes						Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.	
States of Matter/Reversible and	Reversible and irreversible changes						Demonstrate that dissolving, mixing and changes of state are reversible changes.	

States of Matter/Reversible and Irreversible Changes	Reversible and irreversible changes						Explain that some changes result in the formation of new materials and that this kind of change is not reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	

Science - Physics

		Pre-school and Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Light	How light travels and how we see.				Recognise that he/she need light in order to see things and that dark is the absense of light.			Use the idea that light travels in straight lines to explain that ideas that objects are seen because they reflect light to the eye.
Light	How light travels and how we see.				Notice that light is reflected from surfaces.			Recognise that light appears to travel in straight lines.
Light	How light travels and how we see.				Recognise that light from the sun can be dangerous and there are ways to protect their eyes.			Explain that we see things because light travels from light sources to our eyes or from light sources to objects to eyes.
Light	Shadows				Recognise that shadows are formed when the light from a light source is blocked by a solid object.			Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Light	Shadows				Find patterns in the way that the size of shadows change.			
Sound	Understand that sounds are made by vibrations.					Identify how sounds are made, associating some of them with something vibrating.		
Sound	Understand that sound travels in vibrations.					Recognise that vibrations from sounds travel through a medium to the ear.		
Sound	Identify patterns in sound					Find patterns between the pitch of a sound and the features of the object that produced it.		
Sound	Identify patterns in sound				.	Find patterns between the volume of the sound and the strength of the vibrations that produced it.		

Sound	Identify patterns in sound					Recognise that sounds get fainter as the distance from the sound source increases.		
Forces and Magnets	Understand and compare how things move.				Compare how things move on different surfaces.			
Forces and Magnets	Forces				Notice that some forces need contact between two objects but magnetic forces can act at a distance.		Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.	
Forces and Magnets	Forces				Observe how magnets attract or repel each other and attract some materials but not others.		Identify the effects of air resistance, water resistance, and friction, that act between moving surfaces.	
Forces and Magnets	Forces				Compare and group together a variety of everyday materials on		Recognise that some mechanisms , inlcuding levers, pulleys and gears, allow a small	

					the basis of whether they are attracted to a magnet and identify some magnetic materials.		force to have a greater force.	
Forces and Magnets	Forces				Describe magnets as having two poles.			
Forces and Magnets	Forces				Predict whether two magnets will attract or repel eachother depending on which poles are facing.			
Electricity	Identify appliances that use electricity.					Identify common appliances that run on electricity.		
Electricity	Construct and draw simple circuits.					Construct a simple series electrical circuit identifying and naming its basic parts, including cells, wires, bulbs,		Use recognised symbols when representing a simple circuit in a diagram.

						switches and buzzer.		
Electricity	Understand how different components impact on others within a circuit.					Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.		Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
Electricity	Understand how different components impact on others within a circuit.					Identify whether or not a lamp will light in a simple series circuit, based on if the bulb is part of a complete loop.		Compare and give reasons for variations in how components function, including the brightness of the bulbs, loudness of buzzers and the on/off position of switches.
Electricity	Understand how different compo					Recognise some common conductors and insulators, and associate metals with		

	nents impact on others within a circuit.					being good conductors.		
Seasonal Changes	Observe changes in seasons		Observe changes across the four seasons					
	Observe and describe weather and day length		Observe and describe the weather associated with the seasons and how day length varies.					
Earth and Space	Describe the movement of planets related to the sun						Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.	
Earth and Space	Describe the movement of the moon						Describe the movement of the Moon relative to the Earth.	

Earth and Space	Describe the sun, earth and moon						Describe the sun, Earth and Moon as approximately spherical bodies.	
Earth and Space	Explain day and night						Use the ideas of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	

Characteristics of Effective Computing Teaching

What would I see in a unit of Science? What would I see in a Lesson?

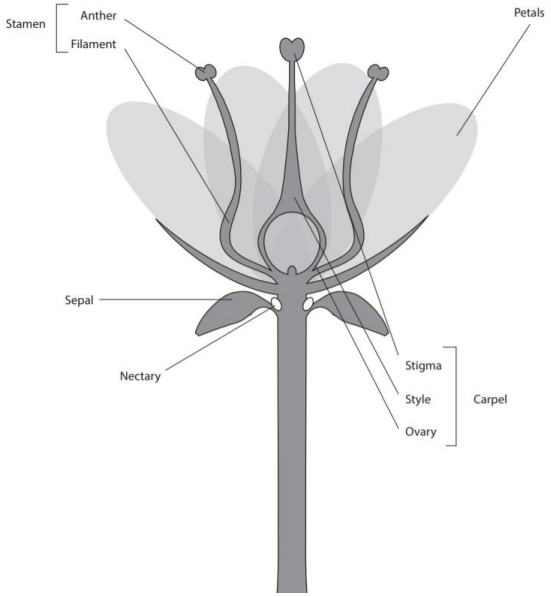
Elicitation of prior knowledge about a topic through: Concept cartoons Quizzes Post it notes Card sorting – explore reasons Discussion	Developing competency in Science skills and understanding: elicit / revisit prior knowledge; teach new knowledge; investigate, assess. Teaching in a sequential manner therefore learning is progressive. (See planning format example)	Opportunity to develop Scientific skills: Planning Observing Gathering and Recording Information Concluding Evaluating
Practical, hands on investigations to include: • Comparative / fair testing. • Research • Observation over time. • Pattern seeking. • Identifying, grouping and classifying. • Problem solving.	5 minute recap at the beginning of each lesson to encourage retention of key knowledge and vocabulary.	Opportunities to use and develop Science vocabulary Use of knowledge organiser to aid this
Assessment of learning –	Exploration of common misconceptions.	Development of knowledge, skills and understanding in line with the National Curriculum.

Example Science Unit of Work Plan

Year group: 3		**Area of focus:** (Rising Stars: Unit 4 – How does your garden grow?) Biology: Understanding plants	
Prior objectives (Taken from Planning Matrix)	Year 2: Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to stay and grow healthily and how changing these effect the plant. Know that plants are living and eventually die. Year 1: Identify and describe the basic structure (at least: flower, leaf, root, stem, trunk, seed, branch and petal) of a variety of common flowering plants, including deciduous and evergreen trees.	**Current year group objectives (Taken from Planning Matrix)**	Year 3: Identify, locate 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. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Investigate the way in which water is transported within plants
Key vocabulary	Root: helps anchor the plant into the soil. Takes up water and nutrients. Stem: holds the plant upright and supports the leaves. Contains tubes that allow water to travel from the roots to the rest of the plant. Flower: the part of the plant where seeds are made. Leaves: catch sunlight and use this to make food. Veins: tubes in the leaf that carry water and food. Germinate: when a seed starts to grow and produce a root and shoot. Pollen: dust-like powder made in the stamen of a flower. Pollination: moving the pollen from the stamen of one flower to the stigma of another. Ovary: the part of the flower that contains the ovules.		

	Sepals: protect the rest of the flower as it grows. Stamen: the male part of the flower produces pollen. Carpel: female part of the flower – made of stigma, style and ovary. Stigma: part of the carpel that pollen grains attach to during pollination. Style: the middle part of the carpel, connecting the ovary to the stigma. Ovule: these are like eggs – they develop into seeds. Petal: part of the flower which attracts insects – often brightly coloured.
Lesson 1: Elicitation and recap	TBAT: Elicitation: Share a concept cartoon about plants and discuss as a class Post it notes as a class – what do you know about plants? Can you name any? What do plants need to grow?
Lesson 2: Teach new knowledge **Parts of a plant and their functions**	TBAT: Identify, locate and describe the functions of different parts of a flowering plant (roots, stem, trunk, leaves and flowers) **Quick challenge:** Explain why tall trees don't fall over. What's keeping them up? Think about the different plants that we eat. For each one – do we eat the leaf, root, stem or flower? (N.B. fruits grow from the flower) **Main activities** Get into groups: Bring in examples of plants for the children to look at, such as geraniums in pots. Ask groups to identify the different parts of the plants that they can remember from Year 1. Get groups to discuss what job they think each part of the plant does. Write their ideas on sticky notes. Carefully lift one plant out of the pot to show the roots. Then discuss their ideas as a class. The children can label the parts of a plant on 'Plant parts' activity sheet (Activity resource book, page 31). Class activity: Ask the children to think of a pose or an action that they can perform for each part of the plant. For example, they could stand up straight to mimic a stem; and leaves catch sunlight, so they could mime catching something. Then show them the 'Plant parts song' and ask them to do their

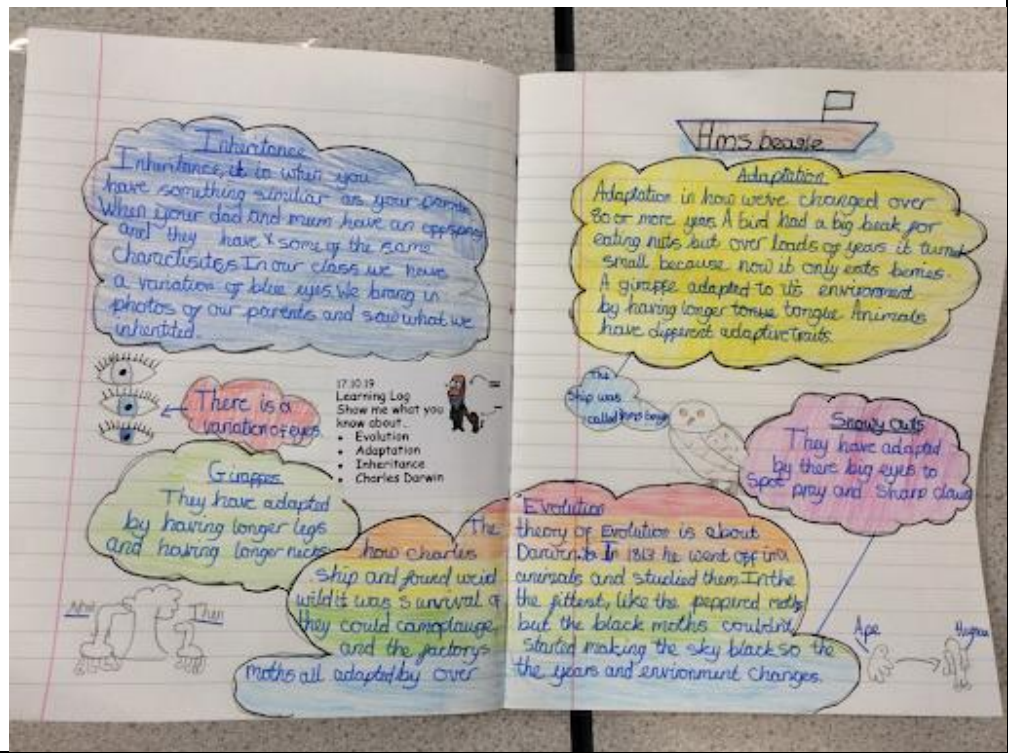
	actions as each part of the plant is mentioned. Check out www.schooltube.com/video/8b5cd92efbe9708a4a5a. Get into groups: Take the children outside to examine a tree. How is it the same as the plants they were looking at in the classroom? How is it different? Can they identify the leaves, roots and stem? Can they see any flowers? **Independent activity:** Make a collage of a plant from different materials such as silver paper, scrunched-up crepe paper, string and sequins. Add labels for each part and a caption explaining the function Differentiation: word bank, cut and stick labels, gap fill for function
Lesson 3 Teach new knowledge **What is pollen?**	TBAT: Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. **Recap** Quick game in pairs matching the parts of a flower to a diagram with the functions – see who can do it in the quickest time? **Quick challenges** Discuss hay fever – how many children in your class have it? Do they know what causes it? Show some different flowers on the whiteboard. Can the children name them? Do some research to find the correct answer **Main activities**

	Get into groups: Take a close look at a lily or a tulip. Identify the different parts of the flower. Point out where the pollen is made. Gently remove the petals and sepals, placing them on a large sheet of paper. Then carefully remove the stamen and carpels. Stick all the parts down onto a big sheet of paper using a large strip of sticky tape and label each part. Count the number of sepals, petals, stamens and carpels in the flower. Be careful: pollen can stain clothes. Children can use the activity sheet, 'Flower power' to label the parts of a flower (Activity resource book, page 32). Photograph dissecting of flower for science books.  Get interactive: Children can label the parts of a flower on the interactive activity, 'Flower power' (My Rising Stars). Class activity: What could be more fun than a role playing activity to demonstrate how pollination works? Start by discussing the process of pollination. Then, in a large space, have the children act out the process of pollination. Get some children to act as the stamen and stigma inside flowers and some to be insects. The insects can collect pollen (pingpong balls or beads) from the stamen of one flower and deliver it to the stigma of another. Top tip: Film the role playing activity with a digital camera so your class remember the fun they had taking part. Try it: Discuss other ways for plants to spread their pollen. For example, some plants pollinate without the help of insects. They just dump pollen into the air and it floats away to other plants.
Lesson 4 Teach new knowledge Seed spreading	TBAT: Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. **Recap** Label parts of a flower on the interactive activity 'Flower Power' (My Rising Stars) **Quick Challenge** What do the children think happens to a flower once it has been pollinated? Have they ever seen rosehips? What are they? Where did the rose go?

	Main activity Get into groups: Show the children real examples of seeds from packets. You could also show images taken from the Internet of conkers, acorns, etc. Discuss what seeds are and why plants might make them. (Take care: wash hands after handling packet seeds.) The children can record their observations on the 'Type of seed' sheet (Activity resource book, page 33). Pair up: Discuss what fruit is, looking at some real examples. You could start by cutting a sweet pepper in half. Ask the children to draw what they see inside and label the seeds. Then repeat the process with other fruit such as a tomato and an apple. Discuss why plants make fruit like this for the seeds. And how does it help the seeds spread? Get into groups: Ask the children to harvest some of the seeds from the fruits they are looking at. Dry these out for a few days and then plant them in small pots of compost. See 'It's harvest time!' practical, page 67. Get interactive: Discuss the different ways a seed can be dispersed. For example, how does a sycamore seed or dandelion seed travel to somewhere else? You could liven up the lesson by using the following resource on your interactive whiteboard: www2.bgfl.org/bgfl2/custom/resources_ftp/client_ftp/ks2/science/ plants_pt2/dispersal.htm
Lesson 5 and 6: Teach new knowledge Scientific investigation **Water transportation**	TBAT: Investigate the way in which water is transported within plants. **Recap** 5 minute quiz with 5 questions from block of learning so far. **Quick challenge** Show the children a photograph of a really tall tree. Ask them for their ideas about how we could get water to a person sitting at the top of a tree using different methods. From buckets on a rope to a really long hosepipe, there are lots of ways to choose from. How many can the children think of? **Main activities:** https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-how-does-water-get-from-the-roots-to-the-leaves/zdtfjhv **Scientific question: How does water transport through a plant?**

	"I'm going to put these white carnations into pots of food colouring. What do you think will happen?" Children share thoughts on post it notes. - Create prediction: what will happen to the flowers? Which colour do you think will cause the most change? - Method - How are you going to make it a fair test? Keep the flower heights the same, volume of water, amount of food colouring. Get into groups: Stand white carnations in pots of water with food colouring. Leave them for a few hours, observing every half an hour or so and keeping post it notes observations and see what happens to the colour of the flowers. Take photographs before and after to help the children see just how much the carnations have changed. **Next lesson:** Let's recap – what did we look at in our investigation? What do you notice has happened to the flowers? Look at your observations that you have recorded as a class. - Write up results Pair up: Explain that the stem of a plant is full of many long, thin tubes that draw water up from the roots right to the top of the plant. When water disappears from the leaves, the tubes helps them suck up the water. - Write conclusion using scientific understanding. Plenary: Give each group a pile of drinking straws. Show them how to poke one inside another to create a longer straw. Challenge the groups to see if someone standing on a chair could drink water from a cup on the floor. (You could also look at novelty, looped drinking straws or Strawz connectable drinking straws kits.)
Lesson 7: Assessment	TBAT: Explain what I know about plants, the parts of a plant and water transportation Give children 3 post it notes to record 3 new learnt bits of knowledge

	Children to complete double page spreads showing their knowledge. They can write or draw or a combination of both. Expectation children cover: - Parts of a plant including flower - Pollination and seed dispersal - Water transportation **Example:**



Common misconceptions some children may have

Year 1

Plants	Animals including humans
• plants are flowering plants grown in pots with colored petals and leaves and a stem • trees are not plants • all leaves are green • all stems are green • a trunk is not a stem • blossom is not a flower	• only four-legged mammals, such as pets, are animals humans are not animals • insects are not animals • all 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group • amphibians and reptiles are the same.
Seasonal changes	**Everyday materials**
• it always snows in winter • it is always sunny in the summer • there are only flowers in spring and summer • it rains most in the winter.	• only fabrics are materials • only building materials are materials • only writing materials are materials • the word 'rock' describes an object rather than a material • 'solid' is another word for hard.

Year 2

Living things and their habitats • an animal's habitat is like its 'home' • plants and seeds are not alive as they cannot be seen to move • fire is living • arrows in a food chain mean 'eats'.	**Plants** • plants are not alive as they cannot be seen to move • seeds are not alive • all plants start out as seeds • seeds and bulbs need sunlight to germinate
Animals including humans • an animal's habitat is like its 'home' • all animals that live in the sea are fish • respiration is breathing • breathing is respiration.	**Everyday materials** • only fabrics are materials • only building materials are materials • only writing materials are materials • the word rock describes an object rather than a material • solid is another word for hard.

Year 3

Light • 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	• **Plants** • 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.
Animals including humans • 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.	**Rocks** • 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
Forces and Magnets • the bigger the magnet the stronger it is • all metals are magnetic	

Year 4

Living things and their Habitats • the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain • there is always plenty of food for wild animals • animals are only land-living creatures • animals and plants can adapt to their habitats, however they change • all changes to habitats are negative	**Animals including humans** • arrows in a food chains mean 'eats' • the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain • there is always plenty of food for wild animals • your stomach is where your belly button is • food is digested only in the stomach • when you have a meal, your food goes down one tube and your drink down another • the food you eat becomes "poo" and the drink becomes "wee"
States of matter • 'solid' is another word for hard or opaque • solids are hard and cannot break or change shape easily and are often in one piece substances made of very small particles like sugar or sand cannot be solids particles in liquids are further apart than in solids and they take up more space when air is pumped into balloons, they become lighter	**Sound** Pitch and volume are frequently confused, as both can be described as high or low. • sound is only heard by the listener • sound only travels in one direction from the source

• water in different forms – steam, water, ice – are all different substances • all liquids boil at the same temperature as water (100 degrees) • melting, as a change of state, is the same as dissolving • steam is visible water vapour (only the condensing water droplets can be seen) • clouds are made of water vapour or steam • the substance on windows etc. is condensation rather than water • the changing states of water (illustrated by the water cycle) are irreversible evaporating or boiling water makes it vanish • evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material	• sound can't travel through solids and liquids • high sounds are load and low sounds are quiet
Electricity • electricity flows to bulbs, not through them • electricity flows out of both ends of a battery • electricity works by simply coming out of one end of a battery into the component.	

Year 5

Living things and their Habitats	Animals including Humans
• all plants start out as seeds • all plants have flowers • plants that grow from bulbs do not have seeds • only birds lay eggs.	• a baby grows in a mother's tummy • a baby is "made".
States of matter Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed. • thermal insulators keep cold in or out • thermal insulators warm things up • solids dissolved in liquids have vanished and so you cannot get them back • lit candles only melt, which is a reversible change.	**Earth and Space** • the Earth is flat • the Sun is a planet • the Sun rotates around the Earth • the Sun moves across the sky during the day • the Sun rises in the morning and sets in the evening • the Moon appears only at night • night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth

Forces • the heavier the object the faster it falls, because it has more gravity acting on it forces always act in pairs which are equal and opposite • smooth surfaces have no friction • objects always travel better on smooth surfaces • a moving object has a force which is pushing it forwards and it stops when the pushing force wears out • a non-moving object has no forces acting on it • heavy objects sink and light objects float	

Year 6

Living things and their habitats	Animals including Humans
• all micro-organisms are harmful • mushrooms are plants	• your heart is on the left side of your chest • the heart makes blood • the blood travels in one loop from the heart to the lungs and around the body • when we exercise, our heart beats faster to work the muscles more • some blood in our bodies is blue and some blood is red • we just eat food for energy • all fat is bad for you • all dairy is good for you • protein is good for you, so you can eat as much as you want • foods only contain fat if you can see it • all drugs are bad for you.

Evolution and Inheritance • adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life • offspring most resemble their parents of the same sex, so that sons look like fathers • all characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited • cavemen and dinosaurs were alive at the same time.	**Light** • we see objects because light travels from our eyes to the object.
Electicity • larger-sized batteries make bulbs brighter • a complete circuit uses up electricity • components in a circuit that are closer to the battery get more electricity.	

Finlay Community Primary School

Topic: Plants	Year: One	Strand: Biology

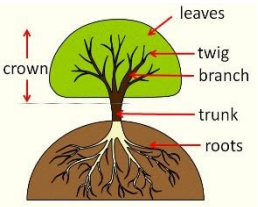
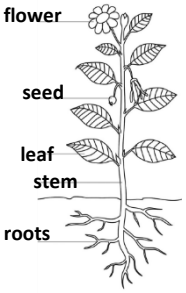
What should I already know?

- Plants can grow.

Vocabulary

Branches	Parts that grow out from a tree truck and have leaves, flowers or fruit growing on them.
Bulb	A root shaped like an onion that grows into a plant or flower.
Common	Something that happens a lot or found in large numbers.
Deciduous	A type of tree or bush that loses its leaves in the Autumn.
Evergreen	A type of tree or bush that has green leaves all year round.
Flower	The part of the plant which is often brightly coloured and has petals.
Flowering	Trees or plants that produce flowers.
Fruit	Something which grows on a tree or bush and contains seeds or a stone. It is often covered in a substance you can eat.
Garden	A piece of land next to a house with flowers, vegetables, plants and grass.
Herb	A plant whose leaves are often used in cooking to add flavour.
Leaf/leaves	The parts of a tree or plant that are flat, thin and usually green.
Petal	The thin coloured or white parts which from the flower.
Plant	A living thing that grows in the earth and has a stem, leaves and roots.
Roots	The parts of a plant that under the ground.
Seed	The small, hard part from which a new plant can grow.
Stem	The thin, upright part if a plant on which the flowers and leaves grow.
Tree	A tall plant that has a hard trunk, branches and leaves.
Trunk	The large main stem from which the branches grow.
Vegetable	Plants that you can cook and eat. Such as carrots, potatoes, cabbages.
Vegetation	Plants, trees and flowers.
Weed	A wild plant that prevents other plants from growing properly.
Wild	Animals or plants that live or grow in natural surroundings.

What will I know by the end of this unit?

The names of some common house plants.	• People may grow plants in their gardens. • They may grow flowering plants or bens or seeds to grow food. • When food is grown for food, it may be called a herb garden of vegetable patch.   
The names of some common and wild plants.	• A wild plant will grow by itself. • It does not need to be cared for. • If it grows somewhere unwanted, it may be a weed.   
Deciduous and evergreen trees	• Deciduous trees lose their leaves every year. The leave are usually broad and flat. • Evergreen trees have green leaves all year round. Their leaves are usually thick, waxy and narrow.  
What are the parts of common trees and plants?	 

Investigation opportunities

- Plant a bean or seed and record observations.
- Create a tally chart to show how many different plants you can find.
- Go on a tree hunt- what types of tree can you see?
- Label the different parts of a plant showing the leaves, flowers, petals, fruit, roots, trunk, branches etc.

Finlay Community Primary School

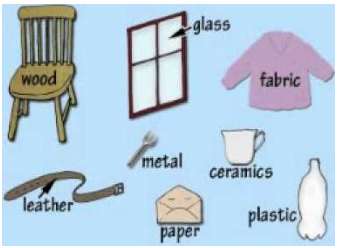
Topic: Materials	Year: One	Strand: Chemistry

What should I already know?

- Objects look and feel different depending on the materials they are made from.
- A variety of materials can be used when painting and making art.

Vocabulary

Absorbent	A material that can easily soak up liquid.
Bendy	An object that can bend easily into a different shape.
Brick	Blocks of baked clay used of building walls. They are usually rectangular and brown or red.
Dull	A colour that is not bright.
Elastic	A rubber material that stretches when you pull then returns to its original shape.
Fabrics	Material made by weaving together cotton, wool or other threads.
Foil	Thin sheets of metal.
Glass	A hard, transparent material.
Man-made	Things that are created by humans.
Metal	A hard material such as iron, steel or lead.
Natural	Things that exist in nature and not man-made.
Opaque	An object or material you can't see through.
Plastic	A material that is lightweight and does not break easily.
Rock	A hard substance which the earth is made of.
Rough	Uneven and not smooth.
Shiny	Things that are bright and reflective.
Smooth	No roughness, holes or bumps.
Soft	Not rough or hard.
Stiff	Firm or does not bend easily.
Stretchy	Slightly elastic.
Transparent	An object or material you can see through.
Waterproof	Does not let water pass through.
Wood	The material which forms the trunks and branches of trees.



What will I know by the end of this unit?

Which materials are some objects made from?	
What words can I use to describe materials?	
Which materials are natural and which are man-made?	• Some materials are natural while others are man -made. 

Investigation opportunities

- How are objects different or similar based on the material they are made from?
- Can you sort man-made materials from natural materials?
- What is the best materials for a:
  - Superhero costume?
  - Curtains?
  - Bookshelf?
  - Umbrella?

Finlay Community Primary School

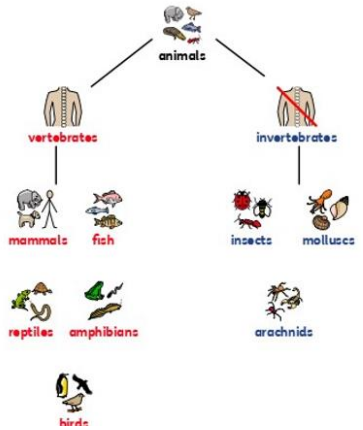
Topic: Animals, including humans	Year: One	Strand: Biology

What should I already know?
• The names of some common animals. • The parts of the human body and how they are associated with each sense.

Vocabulary	
Backbone	The column of bones down the middle of your back.
Carnivores	An animal that only eats meat.
Cold-blooded	An animal's body temperature that changes depending on the surrounding temperature.
Environment	People, things and events that happen in our surrounding area.
Farm	An area of land used to grow crops and keep livestock.
Gills	The organs which help water animals, such as fish, breathe.
Herbivore	An animal that only eats plants.
Invertebrate	An animal that does not have a spine. Such as an insect or an octopus.
Omnivore	An animal that eats both plants and meat.
Pet	A tame animal kept in a household.
Temperature	Measuring how hot or cold something is.
Vertebrate	An animal that has a spine.
Warm-blooded	An animal's body temperature that remains high and is not affected by surrounding temperatures.
Wild	Animals or plants that survive in natural surroundings and not looked after by humans.

Investigation opportunities

- Use the local environment to compare animals.
- Describe how to identify and group animals.
- Group animals according to what they eat.
- Research how to take care of animals in your local environment.



What will I know by the end of this unit?	
What are vertebrates?	There are five groups of vertebrates: • mammals • fish • birds • reptiles • amphibians
What are mammals?	• give birth to live young • usually have hair or fur • warm-blooded • cannot breathe underwater • some common mammals are: * **pets** such as dogs, cats, hamsters * **farm** animals such as cows, sheep and horses * **wild** animals such as foxes, hedgehogs, lions and giraffes * humans
What are fish?	• have fins and scales • breathe underwater using gills • lay eggs in water • cold-blooded
What are reptiles?	• cold-blooded • lay eggs • have scales • cannot breathe underwater
What are birds?	• warm-blooded • have wings and beaks • have feathers • lay eggs
What are amphibians?	• cold-blooded • lay eggs • live on land and water - can breathe underwater through gills
What are invertebrates?	• Invertebrates are animals that do not have a backbone. • They include: • insects such as flies, ladybirds and bees • arachnids such as spiders • molluscs such as snails

Finlay Community Primary School

Topic: Use of everyday materials	Year: Two	Strand: Chemistry

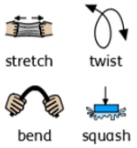
What should I already know?

- Objects are things that you can touch and see and are made from materials.
- Some words to describe materials.
- Materials can be natural or man-made.

Vocabulary

Absorbent	A material that can easily soak up liquid.
Brick	Blocks of baked clay used of building walls. They are usually rectangular and brown or red.
Elastic	A rubber material that stretches when you pull then returns to its original shape.
Fabrics	Material made by weaving together cotton, wool or other threads.
Foil	Thin sheets of metal.
Glass	A hard, transparent material.
Man-made	Things that are created by humans.
Metal	A hard material such as iron, steel or lead.
Natural	Things that exist in nature and not man-made.
Opaque	An object or material you can't see through.
Plastic	A material that is lightweight and does not break easily.
Process	A series of actions that result in an outcome.
Properties	The features that make something recognisable.
Purpose	The reason something is done or made.
Recyclable	Waste that can be processed and reused.
Rough	Uneven and not smooth.
Shiny	Things that are bright and reflective.
Smooth	No roughness, holes or bumps.
Soft	Not rough or hard.
Squash	Pressed with force so an object loses its shape.
Stiff	Firm or does not bend easily.
Stretchy	Slightly elastic.
Suitable	Something that is acceptable for the intended use.
Transparent	An object or material you can see through.
Unsuitable	Something that is unacceptable for the intended use.
Waterproof	Does not let water pass through.

What will I know by the end of this unit?

What are materials used for?	• Materials are used for different reasons based on their properties. • For example- wood can be used for furniture, metal can be used for cans and glass can be used for windows. 
What properties of materials make them suitable for particular uses?	• Glass is used for windows because it is transparent. • Spoons are made from metal because they are waterproof. • They can also be made from plastic because they are light won't hurt children mouths. 
How can you change the shape of materials?	• The shape of some materials can be changed when they are stretched, twisted, bent and squashed. 

Investigation opportunities

- Compare the uses of everyday materials that you can find at home or at school.
- Discuss the difference between absorbent and waterproof materials- what happens when water is placed on these materials?
- Investigate if different materials can be used to make the same item.
- Following the recycling process. Find out which materials are recyclable and why.
- Investigate how objects can be changed by squashing, bending, twisting and stretching.
- Think about why some materials are more suitable than other for different items.

Finlay Community Primary School

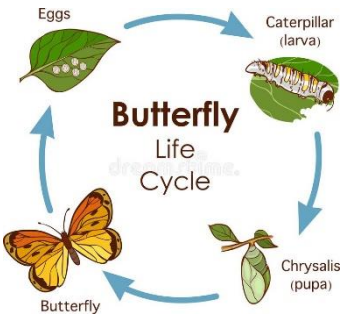
Topic: Animals including humans	Year: Two	Strand: Biology

What should I already know?

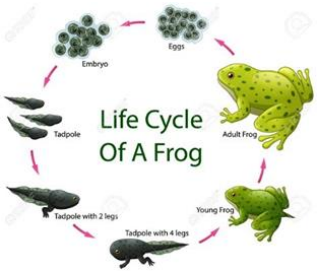
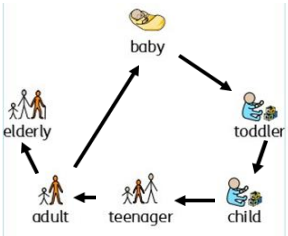
- There are 5 types of vertebrates.
- Vertebrates are animals that have a backbone.
- Some animals are suitable to be kept as pets, whereas others are not.
- Some animals lay eggs and others give birth to live young.

Vocabulary

Backbone	The column of bones down the middle of your back.
Balanced diet	Eating the right amount of a variety of food.
Bar chart	A chart which uses bars to show the value of something and compare between the groups.
Bones	The hard parts in your body. These form your skeleton.
Disease	An illness that can affect animals, humans and plants.
Exercise	Moving your body in order to get fit and healthy.
Farm	An area of land used to grow crops and keep livestock.
Healthy	Feeling well and not suffering from illness.
Hygiene	Keeping yourself and environment clean to prevent illness.
Life cycle	The process that a plant or animal goes through from the beginning until its death.
Medicine	A treatment given by doctors and nurses to help recover from a disease or illness.
Muscles	Something inside your body that you use to make movements.
Offspring	A persons children or an animals young.
Pet	A tame animal kept in a household.
Pictogram	A simple drawing that can represent something.
Skeleton	The bones in your body that make a framework
Survive	Continuing to exist.



What will I know by the end of this unit?

What is a lifecycle?	• The process that a plant or animal goes through from the beginning until its death. • All animals have offspring which grow into adults.  
What do all animals need to survive?	• All animals need water, food and oxygen to survive.
What do humans need to keep healthy?	In order to keep healthy humans must: • Eat a balanced diet • Exercise to keep muscles and bones healthy. • Take medicines that may be offered if you are unwell. • Keep good hygiene levels by regularly washing, brushing your teeth and wearing clean clothes.

Investigation opportunities

- Match animals to their offspring and compare the differences.
- Order the stages of a human's life.
- Research animal charities, such as the RSPCA.
- Keep a record of the foods you eat and evaluate your diet.
- Participate in exercise and see how it affects your body.
- Collect information about your favourite food and present it in a bar char/ pictogram.

Finlay Community Primary School

Topic: Living things and their habitats	Year: Two	Strand: Biology

What should I already know?

- What is living, dead and never been alive.
- The names of come plants and trees.
- Animals can be grouped into vertebrates and invertebrates.
- Animals can be grouped into carnivores, herbivores and omnivores.
- All animals have offspring that grow into adults.

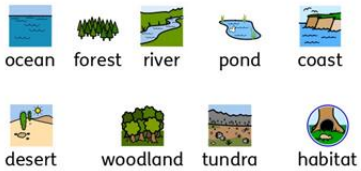
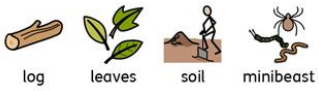
Vocabulary

Biomes	A natural area of animals and vegetation.
Carnivores	An animal that only eats meat.
Depend	Needing something in order to survive.
Food chain	It shows the order that living things use to depend on each other for food.
Habitat	The natural environment in which an animal of plants lives.
Herbivore	An animal that only eats plants.
Invertebrate	An animal that does not have a spine. Such as an insect or an octopus.
Microhabitat	A small part of the environment that supports a habitat. For example, a fallen log in a wood.
Minibeast	A small invertebrate such as an insect.
Offspring	A persons children or an animals young.
Omnivore	An animal that eats both plants and meat.
Plant	A living thing that grows in the earth and has a stem, leaves and roots.
Source	Where something comes from.
Tree	A common plant that has a trunk, branches and leaves.
Vegetation	Plants, trees and flowers.

Investigation opportunities

- Carefully observe and compare different habitats. Are there any similarities of differences?
- Observe a microhabitat. What living things can you find? How can they survive there?
- Match animals and plants to their correct habitats.
- Discuss questions such as 'why would a polar bear not survive in the desert?'.
- Create your own simple food chains and discuss what would happen if the chain was broken or one living thing did not exist.

What will I know by the end of this unit?

What is a habitat?	• A habitat is where living things can find everything they need to survive. Including oxygen, water, shelter and food. • The size of a habitat can vary. They can be huge like the ocean or much small like under a log. 
What is a microhabitat?	• Microhabitats are very small and animals such as minibeasts live there. Including, ants, snails, centipedes. • They are able to survive there because they are able to find everything they need to survive. • Examples of microhabitats include under stones and logs, in the soil and under leaves. 
How do animals and plants depend on each other?	• Plants and animals depend on each other in order to survive. For example, worms depend on plants and birds depend on worms. This is called a food chain. • If there were no worms, there would be less birds because the competition for other food sources would be greater. • All living things have a part to play in food chains. Without them, other plants and animals may not be able to survive.

Finlay Community Primary School

Topic: Plants	Year: Two	Strand: Biology

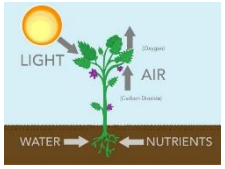
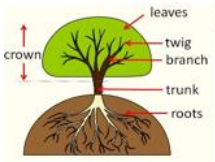
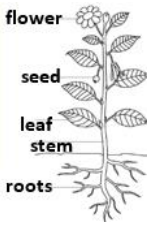
What should I already know?

- Plants can grow.
- The names of some common garden and wild plants.
- Deciduous trees lose their leaves every autumn whereas evergreen trees keep their leaves all year round.
- The parts of a plant including petals, seeds, stem, trunks and branches.

Vocabulary

Branches	Parts that grow out from a tree truck and have leaves, flowers or fruit growing on them.
Bulb	A root shaped like an onion that grows into a plant or flower.
Crop	Plants that are gown in large quantities for food.
Deciduous	A type of tree or bush that loses its leaves in the Autumn.
Evergreen	A type of tree or bush that has green leaves all year.
Flower	The part of the plant which is often brightly coloured and has petals.
Flowering	Trees or plants that produce flowers.
Fruit	Something which grows on a tree or bush and contains seeds or a stone. It is often covered in a substance you can eat.
Garden	A piece of land next to a house with flowers, vegetables, plants and grass.
Herb	A plant whose leaves are often used in cooking to add flavour.
Leaf/leaves	The parts of a tree or plant that are flat, thin and usually green.
Nutrients	Substances that help plants and animals to grow.
Petal	The thin coloured or white parts which from the flower.
Plant	A living thing that grows in the earth and has a stem, leaves and roots.
Roots	The parts of a plant that under the ground.
Seed	The small, hard part from which a new plant can grow.
Stem	The thin, upright part if a plant on which the flowers and leaves grow.
Tree	A tall plant that has a hard trunk, branches and leaves.
Trunk	The large main stem from which the branches grow.
Vegetable	Plants that you can cook and eat. Such as carrots, potatoes, cabbages.
Vegetation	Plants, trees and flowers.
Weed	A wild plant that prevents other plants from growing properly.
Wild	Animals or plants that live or grow in natural surroundings.

What will I know by the end of this unit?

Plants that are living things and require things to grow.	• To grow successfully, plants must have water, nutrients, soil and light. • Plants are living things and can move, grow, react to their surroundings and reproduce. 
Which plants do we eat?	• Many plants can provide fruit which carry their seeds. These can be crops grown by farmer or planted in our own gardens. • We can also eat different parts of vegetables such as root vegetables (carrots), stem vegetables (spring onion), leafy vegetables (lettuce) and flowering vegetables (broccoli). • Other plants can also produce nuts, seeds, herbs and grains for cereals.
What are the common parts of plants and trees?	 

Investigation opportunities

- Go on a plant/ tree hunt find the different features.
- Plant a seed or bulb and record your observations.
- Dissect a variety of fruit. Where are the seed located? Do they all look the same?
- Eat a variety of vegetables and decide what plant they came from.
- Sort through pictures of living and non-living things.

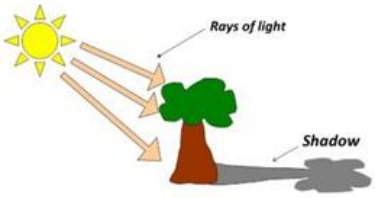
Finlay Community Primary School

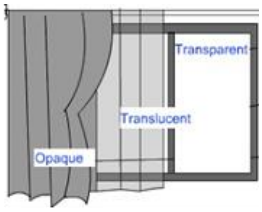
Topic: Light	Year: Three	Strand: Physics

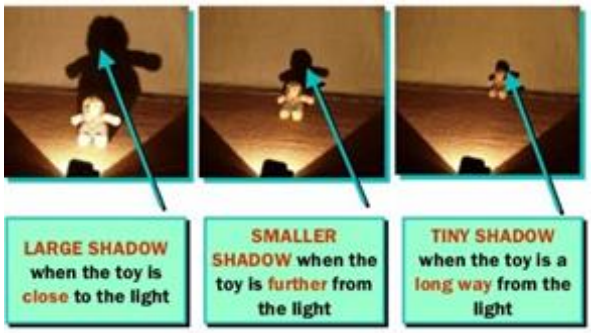
What should I already know?
• Some things can produce light, such as lamps or candles.

Vocabulary	
Angle	The direction from which you look at something.
Bright	A colour that is not dark. It is strong and noticeable.
Chemical reactions	A process that changes the structure of something.
Dark	The absence of light.
Dim	Light that is not very bright
Electricity	A form of energy that can be used for light and heating. It is carried through wires.
Emits	To produce.
Light	A brightness that allows you to see things.
Mirror	A piece of glass that can reflect light. This allows you to look at yourself and see your reflection.
Opaque	An object or material you can't see through.
Product	Something that is produced.
Reflects	When something is sent back from the surface and cannot pass through.
Shadows	A dark shape on a surface that Is made when light cannot pass through an object.
Source	Where something comes from.
Translucent	An object or material that some light can pass through.
Transparent	An object or material you can see through.

What will I know by the end of this unit?	
What is a light source?	• A light source is something that produces and emits light by burning electricity or chemical reactions. • Electric lights can include lamps, street lights and car headlamps. • Burning light sources include the sun and flames from a fire. • Light that is caused by chemical reaction is a lot less common. This only happens what chemicals react and light is a product of that reaction.
Why do we need light?	• We need light so we are able to see when it is dark. Dark is the absence of light. • When we are driving at night, we need car headlight and street lamps to be able to see and keep safe.
What are not sources of light?	• The moon is not a source of light, even though we can see it in the dark. This is because light is reflected from the sun onto the moon's surface. • Shiny things are not light sources, they only reflect the light.
How does light travel?	• Light can only travel in straight lines. • When light is blocked by an opaque object, a dark shadow is formed.







Investigation opportunities

- Order which materials are reflective from most to least.
- Explore which materials make shadows.
- What happens when light is reflected from different surfaces.
- What happens when light is reflected from a mirror? What will happen if the mirror or light source angle is changed?
- Explore if you can change the shape and sizes of shadows.

Finlay Community Primary School

Topic: Forces and magnets	Year: Three	Strand: Physics

What should I already know?

- The shape of some objects can be changed when they are stretched, twisted, squashed and bent.
- Know how different toys can move.
- Know what are force is. Understand that a push and a pull are types of forces.
- Forces are applied to an object to make it move or stop moving.
- The strength of the force determines how fast or slow the object moves.

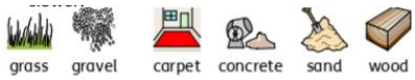
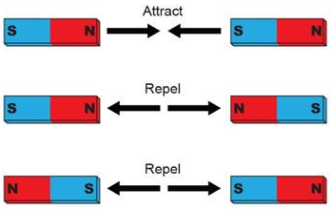
Vocabulary

Attract	If two objects attracts to one another, they move towards each other.
Bendy	An object that can be manipulated into a curved shape.
Friction	A force that slows down movement between two surfaces.
Force	The pushing or pulling effect that something has on something else.
Gravity	The force that causes thing to drop to the ground.
Magnet	A piece of iron that attract other metal materials.
Magnetic field	The area around a magnet that the force is felt.
Metal	A hard substance such as iron, steel, gold or lead.
Motion	The activity of moving or changing position.
Non-magnetic	An object that is not magnetic.
Opposite	Used when things are describe as completely different in a particular way. Eg. North and South.
Position	Where something is in relation to other things.
Pull	When you hold something firmly and use force to move it towards you.
Push	When you use force to move something away from you.
Resistance	A force that slows down a moving object.
Squash	An object that is pressed or crushed so it loses its shape.
Stretchy	Slightly elastic.
Surface	The top part of an object.
Twist	Turn something to make a spiral shape.

Investigation opportunities

- Investigate which surface causes the most and least friction.
- Discuss how magnets are used in everyday life.
- Investigate which materials are magnetic and sort between objects that are magnetic and those that are non-magnetic.
- Investigate if the size of a magnet affects how strong it is (using chains of paper clips of varying lengths)

What will I know by the end of this unit?

What are forces?	• Forces are pushes and pulls. These change the motion on an object. • They will make it start to move, slow down, speed up or stop. • For example, when a cyclist pushes down on the pedals of a bike, it begins to move. The harder the cyclist pedals, the faster the bike moves.
How do different surfaces affect the motion of an object?	• Forces act in opposite directions to each other. • If an object moves across a surface, friction causes it to slow down. The can move differently, depending on the type of surface. • On a ramp, the force used to move the object down is called gravity. 
How do magnets work?	• Magnets produce a magnetic field. When an object enters this, it will either attract (move towards the magnet) or repel (move away from the magnet). 
Which materials are magnetic?	• Objects that are magnetic are attracted to magnets. • Iron and steel are magnetic, whereas aluminium and copper are not.
How do magnetic poles work?	• One end of the magnet is called the north pole and the opposite end is called the south pole. • Opposite poles attract, similar poles repel. • If you place two magnets so the south pole of one faces the north pole of the other, the magnets will move towards each other. This is called attraction. • If you place the magnets so that two of the same poles face each other, the magnets will move away from each other. They are repelling each other. 

Finlay Community Primary School

Topic: Animals, including humans	Year: Three	Strand: Biology

What should I already know?

- The parts of a human body and what they do.
- There are five types of vertebrates.
- Animals need water, air and food to survive.
- The different ways in which humans can be healthy.

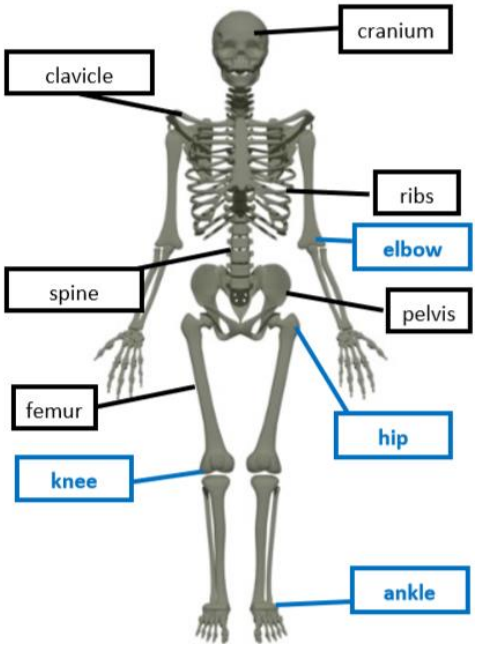
Vocabulary

Backbone	The column of bones down the middle of your back.
Bones	The hard parts in your body. These form your skeleton.
Contract	Making smaller by tightening or shrinking.
Elbow	The joint between the upper and lower arm.
Endoskeleton	The internal skeleton of an animal.
Exoskeleton	The protective structure covering the outside of the body of some animals.
Joints	The junction between two or more bones
Muscles	Something inside your body that you use to make movements.
Organs	A part of your body that has a particular purpose.
Protect	Prevent someone or something from being harmed or damaged.
Relax	When something becomes less tense or firm.
Skeleton	The bones in your body that make a framework.
Support	To hold something.
Tendons	A strong cord in a persons or animals body which joins a muscle to a bone.
Vertebrate	An animal that has a spine.

Investigation opportunities

- Match animals to their skeletons and explain your reasons for this.
- Explore ideas about what would happen if humans did not have skeletons.
- Identify which bones are used for support (e.g. backbone), which are used for protection (e.g. cranium) and which are used for movement (e.g. joints).
- Sort pictures of animals into 2 groups- those who have endoskeletons and those who have exoskeletons.

What will I know by the end of this unit?

What are the different types of skeletons?	• Vertebrates are animals that have a backbone. These skeletons are called endoskeletons - this means that the skeletons are on the inside of the bodies.  • When the skeleton exists outside the body, it is called an exoskeleton. An exoskeleton is a covering that supports and protects animals. These have to be shed and a new skeleton is grown. 
What does an endoskeleton do?	• These skeletons provide support and shape you an animal's body, allow movement through the joints and protects organs. For example, the skull protects the brain.
How do we move?	• Joints are where bones meet - they allow our bodies to move. • We move by contracting and relaxing our muscles. • Muscles are connected to bones by tendons.
The Human Skeleton **bones** **joints**	

Finlay Community Primary School

Topic: Rocks	Year: Three	Strand: Chemistry

What should I already know?

- The role of Mary Anning in palaeontology and the discovery of fossils.
- Soil contains nutrients and these help plants to grow.
- Magma is molten rock that is formed in very hot conditions inside the earth.

Vocabulary

Absorb	Soak up or take in.
Bedrock	The solid rock in the ground that supports the soil.
Decay	Gradually reducing in quality through a natural process.
Grain	A tiny piece of something such as sand.
Igneous	Rocks that are formed by intense heat.
Imprint	A mark left by the pressure of an object on another.
Leaf litter	Decaying leaves.
Magma	Molten rock formed in hot conditions inside earth.
Man-made	Things created by people.
Metamorphic	rocks that have had their original structure changed by pressure and heat
Mineral	Something that is formed naturally in rocks.
Molten	Rock, metal or glass that has been heated to a high temperature. It then becomes a hot, thick liquid.
Natural	Things that are not made by people.
Nutrients	Substances that help plants and animals grow.
Palaeontology	The study of fossils as a guide to the history of life on earth.
Permeable	Allowing water or gas to pass through or soak into it.
Porous	Something that has small holes in which water can pass.
Prehistoric	A time before information was written down.
Preserve	To protect from decay.
Pressure	When you press hard on something.
Properties	The features that belong to something.
Rock	A solid mass of minerals.
Sediment	Solid materials that settle at the bottom of liquids.
Soils	The substance in which plants grow.
Surface	The top part of something.
Surrounding	To be present all around.
Volcano	A mountains which hot melted rock, gas, steam, and ash from inside the Earth sometimes burst.
Weathered	Something that is affected by the weather.

What will I know by the end of this unit?

What are different types of rocks?	• There are different types of rocks that are naturally formed. These are: Igneous (granite) Sedimentary (limestone and chalk) Metaphoric (slate and marble). • Bricks and concrete are not rocks because they are man-made.  
What are fossils? 	• Fossils are the remains of prehistoric life. • They can be formed when: - a living thing dies and the body get covered and buried in sediment over thousands of years. - Tough bones or teeth are preserved. - Imprints in surrounding sedimentary rock such as footprints. • Fossil can give us information about prehistoric earth.
What is soil?	• It is made from pieces of minerals, rock, decaying plants and water. • There are different layers to soil. 

Investigation opportunities

- Explore the different types of rock in your local environment.
- Investigate what happens if different types of rocks are rubbed together.
- Compare the different types of soil. What differences can you find?
- Research what animals are now found as fossils.
- Investigate what happens to rocks when they are placed in water.

Finlay Community Primary School

Topic: Plants	Year: Three	Strand: Biology

What should I already know?

- Plants can grow.
- The names of some common garden and wild plants.
- Deciduous trees lose their leaves every autumn whereas evergreen trees keep their leaves all year round.
- The parts of a plant including petals, seeds, stem, trunks and branches.
- Plants need water, soil, warmth and air to be healthy.

Vocabulary

Absorb	To soak up or take in.
Anther	The part of a stamen that produces pollen.
Branches	Parts that grow out from a tree truck and have leaves, flowers or fruit growing on them.
Bulb	A root shaped like an onion that grows into a plant or flower.
Carbon dioxide	A gas which is produced by breathing out.
Deciduous	A type of tree or bush that loses its leaves in the Autumn.
Dispersed	Scattered or spread through a large area.
Evergreen	A type of tree or bush that has green leaves all year.
Fertilisation	When pollen meets the ovule to form a seed
Fertiliser	A substance that is added to soil to aid in plant growth.
Flower	The part of the plant which is often brightly coloured and has petals.
Flowering	Trees or plants that produce flowers.
Fruit	Something which grows on a tree or bush and contains seeds or a stone. It is often covered in a substance you can eat.
Germination	If a seed is germinated, it starts to grow.
Healthy	Something that is well and not suffering.
Life cycle	The process of life.
Nutrients	Substances that help plants and animals to grow.
Ovule	A small egg.
Petal	The thin coloured or white parts which from the flower.
Pollen	A powder that is produced by flowers and can fertilise other flowers of the same species.
Roots	The parts of a plant that under the ground.
Seed	The small, hard part from which a new plant can grow.
Stem	The thin, upright part if a plant on which the flowers and leaves grow.
Stigma	The centre part of the flower head that takes in pollen.
Tree	A tall plant that has a hard trunk, branches and leaves.
Trunk	The large main stem from which the branches grow.
Vegetation	Plants, trees and flowers.

What will I know by the end of this unit?

The functions of the different parts of the plant.	• Petals attract bees and insects that help to collect pollen and make seeds. • The seed can then grow to make new plants also known as germination. • The stem carries nutrients and keeps the plant upright. • The roots help to anchor the plant into the ground and absorb the water and nutrients.
What do different plants need to grow?	• air • water • sunlight • nutrients • room to grow • suitable temperature • The amount of each of these may vary depending on the type of plant.
How is water transported within plants?	• Water is transported by to roots, then to the stem and finally to the rest of the plant.
How do flowers help in the life cycle of flowering plants?	• Pollination occurs when pollen from the anther is transferred to the stigma by bees and other insects. • The pollen then travels down and meets the ovule. When this happens, seeds are formed - this is called fertilisation. • Seeds are then dispersed so that germination can begin again.

Investigation opportunities

- Compare the effect on plants if something they need to grow is missing or has been changed.
- Place white carnations in dyed water to observe how plants transport water.
- Dissect a flower to identify each of the different parts that help with fertilisation.
- Observe plant lifecycles and discover how seeds are formed.

Finlay Community Primary School

Topic: Animals, including humans	Year: 4	Strand: Biology

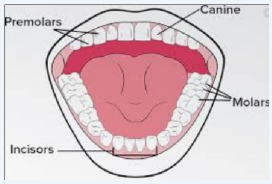
What I should know already:

- - The parts of the human body and what they do.
- All animals need water, air and food to survive.
- The different ways in which humans are healthy.
- Animals get **nutrition** from what they eat.
- Humans and some animals have skeletons and **muscles** for support, protection and movement.
- What **carnivores, omnivores** and **herbivores** are.

Vocabulary

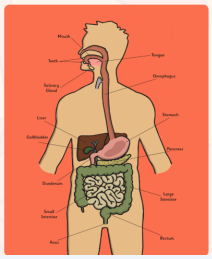
absorb	soak up or take in
canine	**pointed teeth** near the **front** of the mouth of humans and of some animals
carnivore	an animal that eats **meat**
consumer	those that cannot make their own food and **eat** the **producers**
decay	gradually destroyed by a natural **process**
digestion	breaking down **ingested** food material
enamel	the hard **white substance** that forms the outer part of a tooth
excretion	the process of eliminating **faeces**, urine, or sweat from the body
faeces	the solid **waste** substance that people and animals get rid of from their body by passing it through the **anus**
herbivore	an animal that only eats **plants**
incisor	the teeth at the front of your mouth which you use for **biting** into food
ingested	When animals or plants **ingest** a substance, they take it into themselves, for example by eating or **absorbing** it
intestines	the tubes in your body through which food passes when it has left your **stomach**
molar	the **large, flat teeth** towards the back of your mouth that you use for **chewing** food
muscles	something inside your body which connects two **bones** and which you use when you make a movement
nutrition	the process of taking food into the body and **absorbing** the **nutents** in those foods
oesophagus	the part of your body that carries the food from the throat to the **stomach**
omnivore	person or animal eats all kinds of food, including both **meat** and **plants**
organ	a part of your body that has a particular **purpose**
plaque	a substance containing bacteria that forms on the surface of your **teeth**
premolar	two situated on each side of both **jaws** between the first **molar** and the **canine**
predator	an animal that **hunts** and **kills** other animals for food
prey	animals that are **hunted** or **killed** by other animals
process	a **series** of actions used to **produce** something or reach a goal.
producer	**organisms** that make their own **food** through **photosynthesis**
saliva	the watery **liquid** that forms in your mouth and **helps** you to **chew** and digest food
stomach	the **organ** inside your body where food is **digested** before it moves into the **intestines**

What I will know at the end of this unit:

What do our teeth do and how do we look after them?	Our teeth cut and chew our food. They kick start the digestive process which gives us the energy to live. Humans can look after their teeth by brushing and flossing and making sure they do not eat lots of food high in sugar. If you do not look after your teeth, it will increase the chance of plaque and decay.
What are the names and jobs for the different teeth?	Canines are pointy and are used to tear/rip food– they are usually used for chewing meat. Incisors are shovel-shaped and are used to bite lumps out of food. Premolars and molars are flat. They grind and crush food. 
What is a food chain?	A **diagram** showing how **energy** passes between organisms. The chain starts with a **producer** and ends with a top **consumer.** 
How do I construct a food chain?	The arrows show the **energy** passing between the **organisms ,** not the **consumer** eating the **producer.** At the top of the chain, there must be one **consumer**– one that nothing else eats.

The Digestive System

- The smell of food triggers **saliva** to be produced.
- The **digestive** system begins with the mouth and teeth where food is **ingested** and chewed.
- **Saliva** is mixed with the food which helps to break it up.
- When the food is small enough to be swallowed, it is pushed down the **oesophagus** by **muscles** to the **stomach.**
- In the **stomach,** food is mixed further.
- The mixed food is then sent to the **small intestine** which **absorbs nutrients** from the food.
- Any leftover broken down food then moves on to the **large intestine**.
- The food minus the nutrients arrives in the rectum where **muscles** turn it into **faeces**.
  I is stored here until it is pushed out by the anus.
  This is called **excretion**



Investigation opportunities:

Investigate the amount of sugar in drinks and learn how sugar leads to an increase in **plaque** and how this destroys tooth **enamel**.
Compare the teeth of **carnivores, omnivores** and **herbivores.** What do you notice?
Match animals to their teeth and explain your reasons for this.
Identify the parts of the **digestive** system and explain their functions
Create a presentation to show how our food is **digested**.

Finlay Community Primary School

Topic: Electricity	Year: 4	Strand: Physics

What I should know already:

- Electricity is a type of energy that can be carried around by wires for the purpose of heating, lighting and providing power

- Some devices or items that provide light or sound need electricity to power them.

	Vocabulary
appliances	a **device** or machine in your home that you use to do a job such as cleaning or cooking.**Appliances** are often **electrical**.
battery	small **devices** that provide the **power** for **electrical** items such as torches
bulb	the glass part of an **electric** lamp, which gives out light when **electricity** passes through it.
buzzer	an **electrical device** that is used to make a buzzing sound
cell	a synonym for **battery**
circuit	a complete route which an **electric current** can flow around
component	the parts that something is made of
conductor	a substance that heat or **electricity** can pass through or along
current	a flow of **electricity** through a **wire** or **circuit**
device	an object that has been invented for a particular purpose
electricity	a form of **energy** that can be carried by **wires** and in used for heating and lighting, and to provide **power** for **devices**
energy	the **power** from **sources** such as **electricity** that makes machines work or provides heat
fuel	a substance such as coal, oil, or petrol that is burned to provide heat or **power**
generate	cause it to begin and develop
insulator	a non-**conductor** of **electricity** or heat
mains	where the supply of water, **electricity**, or gas enters a building
motor	a **device** that uses **electricity** or fuel to produce movement
power	**Power** is **energy**, especially **electricity**, that is obtained in large quantities from a fuel **source** and used to operate lights, heating, and machinery
source	where something comes from
switch	a small control for an **electrical device** which you use to turn the **device** on or off
wires	a long thin piece of metal that is used to fasten things or to carry **electric current**

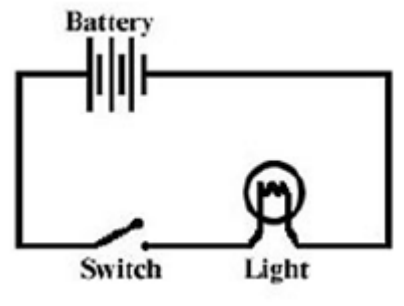
What I will know at the end of this unit:

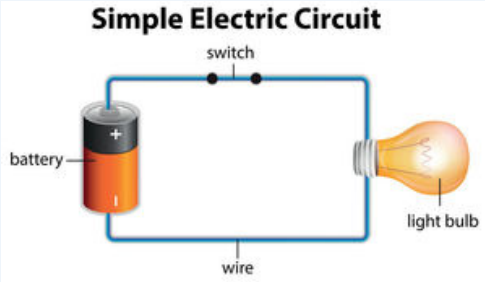
Where does electricity come from?	Electricity is generated (made) from natural sources for example, the sun, wind, water and oil. These are also known as ***fuel sources***.
Which appliances need electricity to work?	Some devices or appliances need batteries to work, whilst some use electricity. Batteries come in different sizes and it all depends on how often and how they are used for. Some appliances/devices that use electricity: 
How does a circuit work?	A circuit that is complete allows electrical current to flow through it using wires.A circuit contains some key components- battery cell, wires and an appliance that needs electricity. The electric current flows through the wires from the battery to the appliance that needs electricity.A switch is a component that can control the flow of the electrical current by reconnecting or breaking the circuit.
What are electrical conductors and insulators?	When objects are placed in an electrical circuit, they either allow or disallow electrical current to flow through them. Objects that allow the electrical current to flow are made out of materials called ***electrical conductors*** Objects that do not allow the electrical current to flow are made out of materials called ***electrical insulators***

Circuit Diagrams

A closed and an open circuit.

A switch determines if the electricity flows.





Investigation opportunities:

Research how to work safely with electricity

Create a variety of circuits

Investigate what would happen if more batteries were added to a circuit

Investigate electrical conductors/insulators

Make circuits using switches

Finlay Community Primary School

Topic: Living things and Their Habitats	Year: 4	Strand: Biology

What I should know already:

Animals can be grouped into **vertebrates** (and then further into fish, reptiles, amphibians, birds and mammals) and **invertebrates**. Animals can also be grouped into **carnivores, herbivores** and **omnivores** and the differences between the teeth of **carnivores** and **herbivores**.

The names of some common wild and garden plants and **deciduous** and **evergreen** trees.

Examples of **habitats** (including **microhabitats**) and the animals and plants that can be found there.

Living things depend on each other to **survive**.

How **food chains** and food webs work.

How land use has changed over time and the effects this has on the **environment** (e.g. **urban** development)

Vocabulary	
biomes	a natural area of **vegetation** and animals
carnivore	an animal that eats meat
classification key	a system which divides things into groups or types
criteria	a factor on which something is judged
deciduous	trees that lose leaves in the autumn every year
environment	all the circumstances, people, things, and events around them that influence their life
evergreen	a tree or bush which has green leaves all the year round
excretion	the process of eliminating waste from the body
food chain	a series of living things which are linked to each other because each thing feeds on the one next to it in the series
habitat	the natural **environment** in which an animal or **plant** normally lives or grows
herbivore	an animal that only eats plants
invertebrate	a creature that does not have a spine, for example an insect, a worm, or an octopus
life	There are seven processes that tell us that living things are alive
microhabitat	a small part of the **environment** that supports a **habitat**, such as a fallen log in a forest
minibeast	a small **invertebrate** animal such as an insect or spider
nutrition	the process of taking food into the body and absorbing the nutrients in those foods
omnivore	person or animal eats all kinds of food, including both meat and **plants**
organism	a living thing
reproduction	when an animal or plant produces one or more individuals similar to itself
respiration	process of respiring; breathing ; inhaling and exhaling air
sensitivity	responding to the external environment
urban	belonging to, or relating to, a town or city
vegetation	**plants**, trees and flowers
vertebrate	a creature which has a spine

What I will know at the end of this unit:

How can living things be grouped?

All living things, also called **organisms** have to do certain things to stay alive. These are the life processes

-movement

-respiration

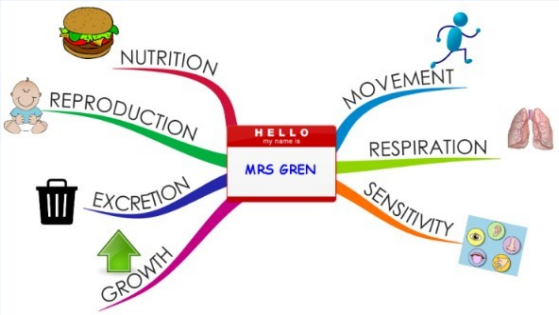
-sensitivity

-growth

-reproduction

-excretion

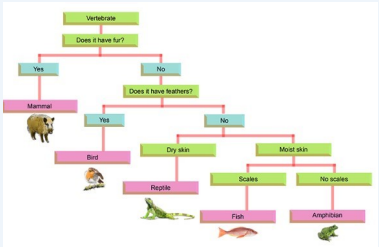
-nutrition



Living things can be grouped according to different **criteria** (where they live, what type of **organism** they are, what features they have). For example, a camel can belong in a group of **vertebrates,** a group of animals that live in the desert, and a group of animals that have four legs.

What is a classification key?

A **classification key** is a tool that is used to group living things to help us identify them.



How can environments change?

Habitats can change throughout the year and this can have an effect on the plants and animals that live there.

Humans can have positive and negative effects on the environment:

positive effects: nature reserves, ecological parks

Investigation opportunities:

Complete Venn diagrams to show if living things can be grouped into two or more groups .

Use **criteria** to sort living things in a Carroll diagram.

Sort **vertebrate** and **invertebrate** animals into groups, describing their key features. Use a **classification key** to identify which group of **vertebrates** animals belong to and then create your own.

Sort plants into groups (e.g. flowering plants and non-flowering plants) and then create a **classification key** to help others identify plants.

Carefully observe **minibeasts** in a **microhabitat** and use a **classification key** to identify them.

Use simple computer software programmes to create a branching **classification key**.

Explore examples of human impact (both positive and negative) on **environments**.

Finlay Community Primary School		
Topic:Sound	Year: 4	Strand: Physics

What I should know already:

- Hearing is one of my five senses.
- Sounds can be combined using musical instruments.

	Vocabulary
amplitude	a measure of the strength of a **sound wave**
decibel	a measure of how loud a sound is
electricity	a form of **energy** that can be carried by wires and in used for heating and lighting, and to provide power for devices
energy	the **power** from **sources** such as **electricity** that makes machines work or provides heat
frequency	a measure of how many times per second the **sound wave** cycles
medium	something that makes possible the transfer of **energy** from one location to another
pitch	how **high** or **low** a sound is
power	**Power** is energy, especially electricity, that is obtained in large quantities from a fuel **source** and used to operate lights, heating, and machinery
sound waves	invisible waves that travel through air, water, and solid objects as **vibrations**
source	where something comes from
transmit	to pass from one place or person to another
travel	how something moves around
vibrations	invisible waves that move quickly
volume	how **loud** or **quiet** a sound is

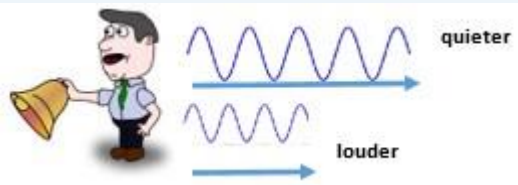
Other Diagrams

Pitch:

- **High pitch** sounds are created by short **sound waves**.
- **Low pitched** sounds are created by long **sound waves**.

Volume:

- The closer you are to the **source** of the sound, the **louder** the sound will be.
- The further away you are from the **source** of the sound, the **quieter** the sound will be.



What is a sound?	A thing that can be heard. The object that makes the sound is called the **source**.
How is a sound made?	• When objects **vibrate**, a sound is made. • The **vibration** makes the air around the object **vibrate** and the air **vibrations** enter your ear. These are called **sound waves.** • If an object is making a sound, a part of it is **vibrating**, even if you cannot see the **vibrations**. 
How do sounds **travel**?	• **Sound waves** travel through a **medium** (such as air, water, glass, stone, and brick). • For example, if somebody is playing music in the room next door, the sound can travel through the bricks in the wall.
How do we hear sounds?	• When an object **vibrates**, the air around it **vibrates** too. This **vibrating** air can also be known as **sound waves**. • The **sound waves** travel to the ear and make the **eardrums vibrate**. • Messages are sent to the brain which recognises the **vibrations** as sounds.
How do sounds change?	**Pitch:** • The **pitch** of a sound is how **high** or **low** it is. • A squeak of mouse has a **high pitch**. • A roar of a lion has a **low pitch**. **Volume:** • The **volume** of a sound is how **loud** or **quiet** it is. • When a sound is created by a little amount of **energy,** a weak **sound wave** is created which doesn't **travel** far. This makes a **quiet** sound. • A small tap of a hammer is used with small amounts of **energy** and so creates a **quiet** noise. • A **vibration** with lots of **energy** makes a powerful **sound wave** and therefore a **loud** sound. • A powerful, smashing tap of a hammer is used with lots of **energy** and so creates a **loud** noise.
How do we measure sound?	• **Amplitude** measures how strong a **sound wave** is. • **Decibels** measure how **loud** a sound is. • **Frequency** measures the number of times per second that the **sound wave** cycles.

Investigation opportunities:

Fill identical jars with different volumes of water. Which one creates the highest pitch?

Which material would make the best sound defender? How can you investigate this?

Make musical instruments using different length strings. How do their pitches differ?

Finlay Community Primary School

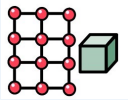
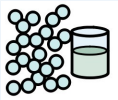
Topic: States of Matter	Year: 4	Strand: Chemistry

What I should know already:

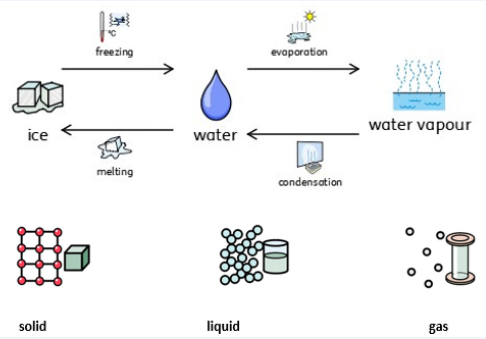
- Why some materials are used for certain purposes because of their properties.
- The water cycle, the evaporation , condensation and precipitation processes.

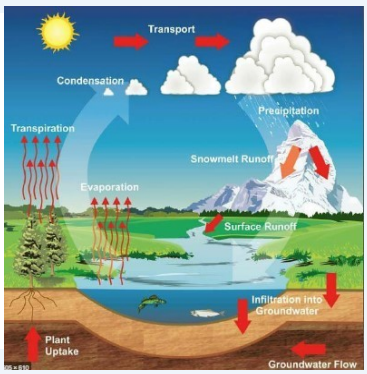
	Vocabulary
condensation	Small drops of water which form when water vapour or steam touches a cold surface, such as a window
cooling	Lowering the temperature of something
evaporation	To turn from a liquid into a gas; pass away in the form of vapour
freezing	If a liquid or substance containing a liquid freezes, it becomes a solid because of low temperatures.
Freezing point	The freezing point of a particular substance is the temperature at which it freezes. The freezing point of water is 0°C.
gas	A form of matter that is neither a liquid or a solid. A gas rapidly spreads out when it is warmed and contracts when it is cooled.
heating	Raising the temperature of something
liquid	In a form that flows easily and is neither a solid or a gas
melting	To change from a solid to a liquid state through heat or pressure
Melting point	The melting point of a particular substance is the temperature at which it melts
particles	A tiny amount or small piece
precipitation	Rain, snow, sleet, dew etc formed by condensation
process	A series of actions used to produced something or reach a goal
properties	The ways in which an object behaves
solid	Having a firm shape or form that can be measured in length, width, and height; not like a liquid or a gas
temperature	A measure of how hot or cold something is
vibrations	When something vibrates, it shakes with repeated small, quick movements
Water cycle	The process by which water on the earth evaporates, then condenses in the atmosphere, and then returns to earth in the form of precipitation.
Water vapour	Water in the gaseous state, especially when due to evaporation at a temperature below the boiling point.

What I will know at the end of this unit:

What is a particle?	Particles are what materials are made from. They are so tiny that we cannot see them with our own eyes. The properties of a substance depends on how their particles are arranged and how they move.
What is a solid? 	In the **solid** state, the material holds its shape. Solids have **vibrating particles** which are closely packed together and form a regular pattern. This explains the fixed shape of a solid and why it cannot be poured. **Solids** always take up the same amount of space.
What is a liquid? 	In the **liquid** state, the material holds the shape of the container it is in. This means that that **liquids** can change shape, depending on the container. **Liquids** have **particles** which are closed together but random. The particles can move over each other and they can be poured.
What is a gas? 	In the **gas** state, **particles** can escape from open containers. **Gases** have **particles** which are spread out and move in all directions.
What happens to the **particles** in water when it is **heated** or **cooled**?	When water (in its **liquid** form) is **heated**, the particles start to move faster and faster until they have enough energy to move about more freely. The water has **evaporated** in to a **water vapour**. When water is **cooled,** the particles start to slow down until a solid structure (ice) is formed. The water has **frozen.** The **temperature** at which water turns to ice is called the **freezing point**. This happens at 0°C

Diagrams





Investigation opportunities:

Grouping materials according to their states. Explain the particles structure of solids, liquids and gases. Explore the effect of temperature on substances e.g. chocolate, butter, cream. Compare their melting points and place them in a table. Research the temperature at which materials change state e.g. when iron melts or when oxygen condenses into a liquid. Observe and record evaporation over time e.g. puddle in playground. Analyse and interpret different forms of data to show the effects of temperature on state of matter. Present what you know about the water cycle using a variety of skills, using appropriate vocabulary. Observe evaporation and condensation in action by using bowls of water and mirrors.

Finlay Community Primary School

Topic: Properties and changes of materials	Year: 5	Strand: Chemistry

What I should know already:

- A variety of everyday materials including wood, plastic, glass, metal, water and rock.
- The physical **properties** of a variety of everyday **materials** (including those that are **transparent**) and to compare and group **materials** on the basis of these **properties**
- How materials are suitably used based on their **properties**.
- How **magnets** and **electrical circuits** work. Some materials which are **magnetic.**
- How shapes of solid objects can be changed by squashing, bending, twisting and stretching.
- **Materials** that are **solids, liquids** and **gases** and their **particle** structure.
- Some **materials** change **state** when they are heated or cooled and the **temperature** at which this happens.
- The roles of **melting, evaporation** and **condensation** in the **water cycle** and the role **temperature** has on the **rate** of **evaporation**.
- Some rocks are **permeable.**

Vocabulary

circuit	a complete route which an electric current can flow around
condensation	small drops of water which form when water vapour or steam touches a cold surface, such as a window
conductor	a substance that heat or electricity can pass through or along
dissolves	when a substance is mixed with a liquid and the substance disappears
electricity	a form of energy that can be carried by wires and in used for heating and lighting, and to provide power for devices
evaporation	to turn from liquid into gas; pass away in the form of vapour.
filtering	a device used to remove dirt or other **solids** from **liquids** or **gases**. A filter can be made of paper, charcoal, or other material with tiny holes in it.
flexible	an object or material can be bent easily without breaking
gas	a form of matter that is neither **liquid** nor **solid**. A **gas** rapidly spreads out when it is warmed and contracts when it is cooled.
insoluble	impossible to **dissolve**, esp. in a given **liquid**.
insulator	a non-conductor of electricity or heat
irreversible	impossible to reverse, turn back, or change.
liquid	in a form that flows easily and is neither a **solid** nor a **gas**.
magnetic	having to do with magnets and the way they work
melting	to change from a **solid** to a **liquid** state through heat or pressure
particles	a tiny amount or small piece
permeable	of a substance, being such that **gas** or **liquid** can pass through it
process	a series of actions used to produce something or reach a goal.
properties	the ways in which an object behaves
rate	the speed with which something happens
resistance	the opposing power of one force against another.
reversible	able to turn or change back
solid	having a firm shape or form that can be measured in length, width, and height; not like a **liquid** or a **gas**
soluble	able to be **dissolved**.
solution	a mixture that contains two or more substances combined evenly
state	the structure or condition of something
temperature	a measure of how hot or cold something is
thermal	relating to or caused by heat or by changes in **temperature**
transparent	If an object is **transparent**, you can see through it
variable	something that can change or that has no fixed value
water cycle	the process by which water on the earth evaporates, then condenses in the atmosphere, and then returns to earth in the form of precipitation.

What I will know at the end of this unit:

How to group **materials** based on their **properties** using more complex vocabulary.	
What are **thermal insulators** and **conductors?**	• **Materials** which are good **thermal conductors** allow heat to move through them easily. • **Thermal conductors** are used to make items that require heat to travel through them easily, such as a saucepan which requires heat to travel through to cook food. • **Thermal insulators** do not let heat travel through them easily. • Examples of **thermal insulators** include woollen clothes and flasks for hot drinks.
What are **electrical insulators** and **conductors?**	• **Electrical conductors** allow electricity to pass through them easily while **electrical insulators** do not. • **Electrical insulators** have a high **resistance** which means that it is hard for electricity to pass through these objects.
What is **dissolving?**	• When the **particles** of a **solid** mix with the **particles** of a **liquid,** this is called **dissolving**. • The result is a **solution.** • **Materials** that **dissolve** are **soluble**. • **Materials** that do not **dissolve** are **insoluble**.
Can **materials** be separated after they have been mixed?	• Some **materials** can be separated after they have been mixed based on their **properties** - this is called a **reversible** change. • Some methods of separation include the use of a magnet, a **filter** (for insoluble materials), a sieve (based on the size of the solids) and **evaporation.** • When a mixture cannot be separated back into the original components, this is called an **irreversible** change. Examples of this include when materials burn or mixing bicarbonate of soda with

Investigation opportunities:

- Find the best material to stop an ice cube from melting. Remember to keep it a fair test by using the same number of ice cubes, or same size and thickness material.
- Place the same amount of a hot liquid in a **thermal insulator** and **conductor**. Measure the temperature over time and plot these on the same line graph. Use the line graph to ask and answer questions.
- Find out if **thermal conductors** also make good **electrical conductors.**
- Explain the difference between **dissolving** and **melting.**
- Investigate which **materials** are **soluble** and **insoluble.**
- Design an experiment that investigates **dissolving** - consider which **variables** you could change including: size of beaker, amount of **liquid**, number of stirs, size of **solid**, **temperature** of **solid** (remember that for a fair test all other **variables** must remain the same).
- Create a variety of mixtures using materials such as salt, sand, water, paper clips and rice and use a variety of methods to separate them.

Finlay Community Primary School

Topic: Animals, including humans	Year: 5	Strand: Biology

What I should know already:

- Animals can be grouped into **vertebrates** (and then further into fish, reptiles, amphibians, birds and **mammals**).
- Some examples of **life cycles** (including those of plants and humans)
- **Reproduction** and **growth** are two of the seven **life processes**.
- How to live a healthy lifestyle.

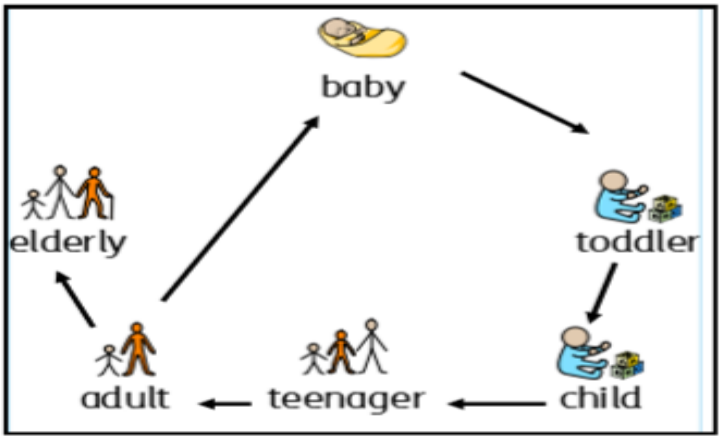
Vocabulary	
adolescence	the period of your life in which you develop from being a child into being an **adult**
adulthood	the state of being an **adult**
development	the gradual growth or formation of something
foetus	an animal or human being in its later stages of **development** before it is born
genitals	the **reproductive organs**
gestation	the process in which babies grow inside their mother's body before they are born
growth	an increase in something
hormones	a chemical, usually occurring naturally in your body, that makes an **organ** of your body do something
independent	If someone is **independent**, they do not need help or money from anyone else.
infancy	the period of your life when you are a very young child
life cycle	the series of changes that an animal or plant passes through from the beginning of its life until its death
life processes	There are seven processes that tell us that living things are alive
mature	When a child or young animal **matures**, it becomes an **adult**
menopause	the time during which a woman gradually stops **menstruating**, usually when she is about fifty years old
menstruation	the approximately monthly discharge of blood by non-pregnant women from **puberty** to the **menopause**
offspring	a person's children or an animal's young
organ	a part of your body that has a particular purpose
puberty	the stage in someone's life when their body starts to become physically **mature**
rapid	A **rapid** change is one that happens very quickly
reproduction	when an animal or plant produces one or more individuals similar to itself
toddler	a young child who has only just learned to walk
vertebrate	a creature which has a spine

What I will know at the end of this unit:

What are the main stages of the human **life cycle?**	• **foetus** - an unborn animal or human being in the very early stages of **development** • newborn **-** this is a baby that has just been born. • **infancy -** this is a period of **rapid** change. Many **toddlers** learn to walk and talk at this stage. • childhood - children learn new things as they grow. They become more **independent**. • **adolescence -** this is when the body starts to change and prepare itself for **adulthood. Hormonal** changes take place over a few years. This is also known as **puberty.** • early **adulthood -** this is when humans are usually at their fittest and strongest. • middle **adulthood** - changes such as hair loss may happen. There are also some **hormonal** changes again and the ability to **reproduce** decreases. • late **adulthood -** there is a decline in fitness and strength.
What is **puberty?**	• **Puberty** is the change that happens in late childhood and **adolescence** where the body starts to change because of **hormones.** • Some changes include **growth** in height, more sweat, hair **growth** on arms and legs, under the armpits and on **genitals**, and **growth** in parts of the body such as male **genitals** and breasts**.** • Females begin to **menstruate**.

Investigation opportunities:

- Research the **gestation** periods of other animals and comparing them with humans
- Collect data around school about height and hand span of different age ranges of pupils. Record the mean, mode and median height of pupils of different ages. Create a graph summarising results.
- Create a life story for a fictitious adult that has made healthy life choices.
- Compare the growth pattern of humans to other animals.
- Consider why humans take so long to learn to walk in comparison to other animals.
- Create a Venn diagram to show what the similarities and differences are between children, adolescents and adults.



Finlay Community Primary School

Topic: Forces	Year: 5	Strand: Physics

What I should know already:

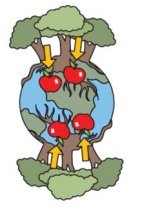
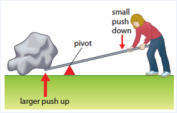
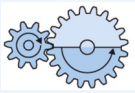
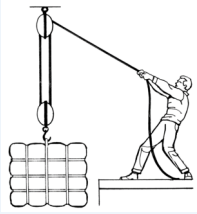
- Some forces need **contact** between two objects but magnetic forces can act at **distance**.
- Magnets **attract** or **repel** each other and attract some materials and not others.
- Which everyday materials are **attracted** to a magnet.
- That a magnet has **two poles.**
- Whether two magnets will **attract** or **repel** by looking at which **poles** are facing.

	Vocabulary
Air resistance	the **resistance** of air to forward movement.
friction	the **resistance** of **motion** when there is contact between two **surfaces**
force	the **pulling** or **pushing** effect that something has on something else
force meter	an instrument for **measuring** forces.
gravity	the **force** which causes things to drop to the ground
Galileo	a famous Italian **scientist** who first used scientific **evidence** to back up his **theories**.
gear	a **toothed wheel** that fits into another gear to transmit motion.
Isaac Newton	a famous English **scientist** who first developed the **theory** of gravity.
lever	a **rigid bar** that transmits force and motion.
metal	a hard substance such as iron, steel, gold, or lead
motion	the activity of changing position or moving from one place to another
newton	the unit a force is measured in
opposite	**Opposite** is used to describe things of the same kind which are completely different in a particular way. For example, north and south are **opposite** directions
position	The **position** of someone or something is the place where they are in relation to other things
pull	When you **pull** something, you hold it firmly and use **force** in order to move it towards you or away from its previous **position**
pulley	a **mounted rotating wheel** with a grooved rim over which a chain or string can move to change the direction of a pulling force.
push	When you **push** something, you use **force** to make it move away from you or away from its previous position
resistance	a **force** which slows down a moving object or vehicle
spring	a **coil of wires** that can transmit a force and motion.
water resistance	the **resistance** of water to forward movement.
weight	the **force** with which something is **attracted** to the Earth.

Investigation opportunities:

Investigate how the gravitational pull on objects of different **sizes** is different. Design a **parachute** and identify ways of improving it. Explore which **surfaces** produce the smallest and greatest amounts of friction. **Plan** and carry out a **fair test** on how to reduce the amount of water resistance on an object. Using plasticine make different **3D shapes** and investigate they travel through water **(streamlining). Build** a Rube Goldberg **machine** using levers, pulleys, springs and levers.

What I will know at the end of this unit:

What is gravity?	•Gravity is a force that **pulls** objects towards the centre of the Earth. •Any two objects have a force of gravity acting between them. •This becomes more **noticeable** when the objects are huge in size (think about the Earth and the Sun). 
What is **air resistance**?	• Air pushes **against** an object as it moves. • The air pushes against an object and **slows** it down. • The **bigger** the object the greater the air resistance. 
What is **water resistance**?	• **Friction** does not just happen between two solid objects. • Friction happens in **liquids** too. • If you **move** something through **water**, it goes **slower**. 
What is **friction**?	• **Friction** is the force that provides us with **grip** on different surfaces. • Without friction, things can feel very **slippery**. • Some materials give you **more** friction than others.
What can **levers** do?	• Levers can change the **direction** of a force or magnify it (make it bigger). • Good examples are crowbars, scissors and bottle openers. 
What can **gears** do?	• Gears are wheels with **teeth** that fit together. • When one moves, the other moves the **opposite** way. • Gears are found in  toys, bikes and cars.
What can **pulleys** do?	• A pulley is a **wheel** fixed at one end with a **rope** passing through it. • When the rope is pulled, it can **lift** an object more **easily.** 

Finlay Community Primary School

Topic: Earth and Space	Year: 5	Strand: Physics

What I should know already:

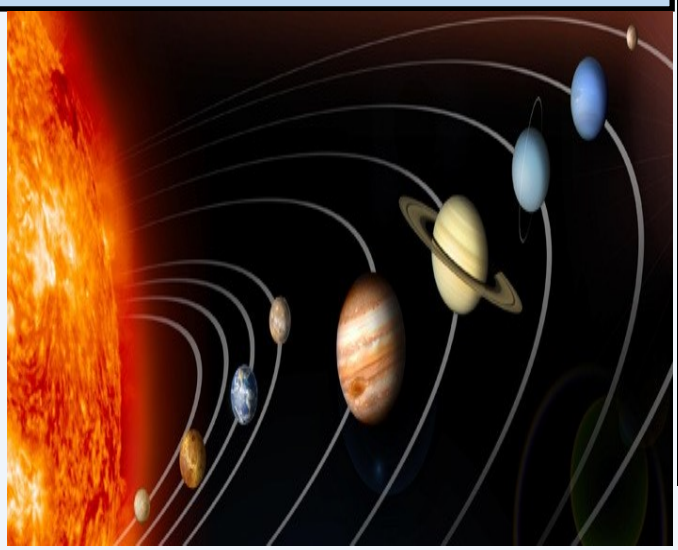
- We have four seasons (autumn, winter, spring and summer).
- The Sun is a source of light but the Moon is not.
- Know that a **shadow** is caused when an object blocks light from passing through it.
- The properties of a **sphere**.

Vocabulary

asteroid	a rock that **orbits** the Sun in a belt between Mars and Jupiter
axis	an imaginary line through the middle of something
comet	a bright object with a long tail that travels around the Sun
galaxy	an extremely large group of stars and planets. Our galaxy is called the Milky Way.
gravity	the force which causes things to drop to the ground
leap year	a year which has 366 days. The extra day is the 29th February. There is a leap year every four years
meteorite	a rock from outer space that has landed on Earth
orbit	the curved path in space that is followed by an object goinground and round a planet, moon, or
planet	a large, round object in space that moves around a star
Solar System	the Sun and all the planets that go round it
star	a large ball of burning gas in space
Time zones	one of the areas into which the world is divided where the time is calculated as being a particular number of hours behind or ahead of GMT
universe	the whole of space and all the stars, planets, and

Investigation opportunities:

- Compare the time of day at different places on Earth.
- Construct shadow clocks and sundials.
- Keep a Moon diary over the course of a month - what



What I will know at the end of this unit:

What causes day and night?	• The Earth **rotates** on its **axis** anti-clockwise and makes a complete **rotation** over 24 hours (a day). • This makes it appear as the Sun moves through the sky but the Earth's **rotation** causes day and night. • Different parts of the Earth experience daylight at different times - this means that it is morning, afternoon and night in different places. This is also the reason why we have **time zones**. • Because of the Earth's tilt, the poles experience 24 hours of sunlight in the summer, and very few hours of sunlight in the winter. • As the Earth **rotates**, **shadows** that are formed change in size and orientation.
Year length and the seasons	• The Earth takes 365 and a quarter days to **orbit** the Sun. • Because of the extra quarter day it takes to **orbit** the Sun, every four years on Earth is a **leap year**! • It is the Earth's tilt that causes the seasons.
The Moon	• The Moon **orbits** the Earth anticlockwise and takes approximately 28 days. • The Moon spins once on its **axis** every time it **orbits** • Earth. This means that we only see one side of the Moon. • The Moon has different phases depending on where it is in its **orbit**. • The Moon's **gravity** causes high and low tides.
What is the **Solar System?**	• There are 8 planets in our Solar System (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune). Pluto is a dwarf **planet**. • They all orbit the Sun, which is a **star**, and they all have moons. • The first four **planets** are relatively small and rocky, while the four outer **planets** are gas giants (Jupiter and Saturn) or ice giants (Uranus and Neptune). • There are also **asteroids**, **meteoroids** and **comets** in the **Solar System**. • The **Solar System** is in a **galaxy** called the Milky Way. • The **galaxy** is in the **universe**.

Finlay Community Primary School

Topic: Living Things and Their Habitats	Year: 5	Strand: Biology

What I should know already:

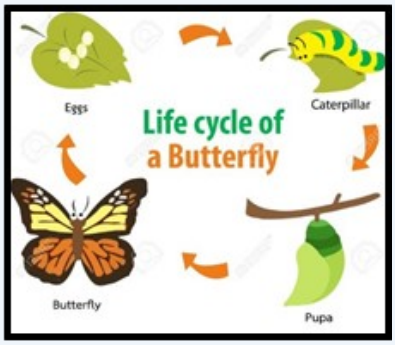
Animals can be grouped into vertebrates (and then further into fish, reptiles, amphibians, birds and mammals) and invertebrates

Some examples of life cycles (including those of plants)

The processes of dispersal, fertilisation and germination

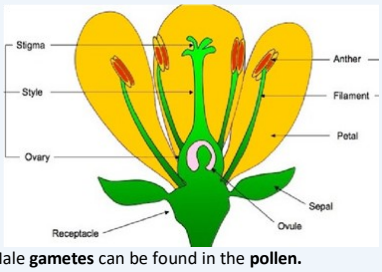
Reproduction is one of the seven life processes.

Parts of a plant, their features and what their functions are.



Vocabulary	
anther	the part of a **stamen** that produces and releases the **pollen**
bulb	a root shaped like an onion that grows into a **flower** or **plant**
cell	the smallest part of an animal or plant that is able to **unction** Independently
dispersed	scattered, separated, or spread through a large area
dissect	to carefully cut something up in order to examine it scientifically
embryo	an unborn animal or human being in the very early stages of development
fertilisation	male and female **gametes** meet to form an **embryo** or **seed**
flower	the part of a **plant** which is often brightly coloured and grows at the end of a **stem**
flowering	**trees** or **plants** which produce **flowers**
function	a useful thing that something does
gamete	the name for the two types of male and female **cell** that join together to make a new creature
germination	if a **seed germinates** or if it is **germinated**, it starts to grow
life cycle	the series of changes that an animal or **plant** passes through from the beginning of its life until its death
mature	When something **matures**, it is fully developed
metamorphosis	a person or thing develops and changes into something completely different
ovary	a female organ which produces eggs
ovule	a small egg
petal	thin coloured or white parts which form part of the **flower**
plant	a living thing that grows in the earth and has a **stem, leaves**, and **roots**
pollen	a fine powder produced by **flowers**. It **fertilises** other **flowers** of the same species so that they produce **seeds**
pollination	To **pollinate** a plant or tree means to **fertilise** it with **pollen**. This is often done by insects
reproduction	when an animal or plant produces one or more individuals similar to itself
seed	the small, hard part from which a new **plant** grows
stigma	the top of the centre part of a **flower** which takes in **pollen**
structure	the way in which something is built or made

What I will know at the end of this unit:

What is **reproduction?**	• **Reproduction** is when an animal or plant produces one or more individuals similar to itself: • Sexual **reproduction**: • requires two parents with **male and female gametes (cells)** • will produce **offspring** that is similar to but not identical to the parent**.** • Asexual **reproduction**: • will produce **offspring** that is identical to the parent • requires only one parent
How do **plants reproduce?**	 • Male **gametes** can be found in the **pollen.** • Female **gametes** can be found in the **ovary** (they are called **ovules).** • **Pollination** occurs when **pollen** from the **anther** is transferred to the **stigma** by bees and other insects. • The **pollen** then travels down and meets the **ovule**. When this happens, **seeds** are formed - this is called **fertilisation**. • **Seeds** are then **dispersed** so that **germination** can begin again. • Some **plants,** such as daffodils and potatoes, can also produce **offspring** using asexual **reproduction**
What are examples of **life cycles?**	• The **life cycles** of mammals, birds, amphibians and insects have similarities and differences. • One difference is that amphibians and insects go through the process of **metamorphosis.** This is when the structure of their bodies changes significantly as they grow (for example, from tadpole to frog or caterpillar to butterfly)

Investigation opportunities:

Dissect a **flower** and identify the different parts of it. Label the different parts and explain their **functions**.

Grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs.

Compare the **life cycles** of mammals, amphibians, insects and birds. What is similar about their **life cycles**? What is different?

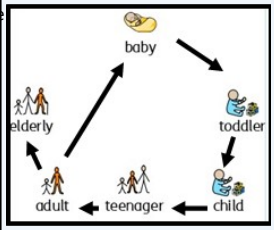
Observe **life cycle** changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment.

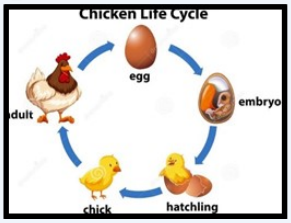
Compare the **life cycles** of **plants** and animals in the local environment with other **plants** and animals (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences.

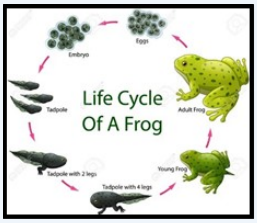
Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.

Compare what you already know about David Attenborough, and compare his work to that of Jane Goodall's.

Examples of life cycles







Finlay Community Primary School

Topic: Electricity	Year: 6	Strand: Physics

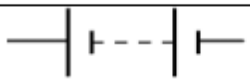
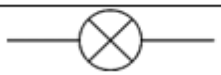
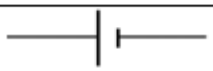
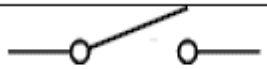
What I should know already:

- **Electricity** is a form of **energy** that can be carried by wires and is used for heating and lighting, and to provide **power** for **devices**.
- **Sources** of light and sound may need **electricity** to work.
- Where **electricity** cones from
- Which **appliances** need **electricity**
- What a **circuit** is, the **components** of a circuit and how it works.
- What **electrical conductors** and **insulators** are.

Vocabulary

ammeter	measures the **current** in a **circuit**
appliances	a **device** or machine in your home that you use to do a job such as cleaning or cooking. **Appliances** are often **electrical**.
battery	small **devices** that provide the **power** for **electrical** items such as torches
bulb	the glass part of an **electric** lamp, which gives out light when **electricity** passes through it.
buzzer	an **electrical device** that is used to make a buzzing sound
cell	a synonym for **battery**
circuit	a complete route which an **electric current** can flow around
component	the parts that something is made of
conductor	a substance that heat or **electricity** can pass through or along
current	a flow of **electricity** through a **wire** or **circuit**
device	an object that has been invented for a particular purpose
electricity	a form of **energy** that can be carried by **wires** and in used for heating and lighting, and to provide **power** for **devices**
energy	the **power** from **sources** such as **electricity** that makes machines work or provides heat
fuel	a substance such as coal, oil, or petrol that is burned to provide heat or **power**
generate	cause it to begin and develop
insulator	a non-**conductor** of **electricity** or heat
mains	where the supply of water, **electricity**, or gas enters a building
motor	a **device** that uses **electricity** or fuel to produce movement
power	**Power** is **energy**, especially **electricity**, that is obtained in large quantities from a fuel **source** and used to operate lights, heating, and machinery.
resistance	a force which slows down a moving object or vehicle
resistor	a part of an electric **circuit** that provides resistance to some of the **current**
source	where something comes from
switch	a small control for an **electrical device** which you use to turn the **device** on or off
voltage	the force of an electric current as measured in **volts**
wires	a long thin piece of metal that is used to fasten things or to carry **electric current**

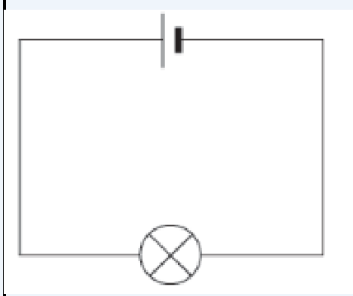
Circuit Symbols

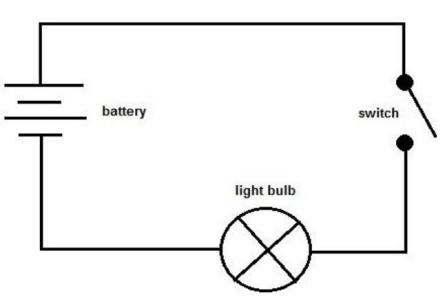
Symbol	Component
	ammeter
	battery
	bulb
	buzzer
	cell
	motor
	resistor
	switch (open)
	switch (closed)

Investigation opportunities:

- Match **circuit** symbols to their meanings and their words.
- Predict, then investigate what happens when more batteries are added to a circuit. Explain why this happens.
- Predict, then investigate what happens when more bulbs, motors are added to a circuit. Explain why this happens.
- Systematically identify the effect of changing one component at a time in a circuit.
- Use **circuit** symbols when representing a simple **circuit** in a diagram.
- Design and make a set of traffic lights, a burglar alarm or some other useful **circuit**.
- Investigate what happens when the **voltage** of the battery changes.
- Investigate what happens when the length of the wires changes.
- Investigate what happens when you add a **resistor** to a **circuit.**

Diagrams





Finlay Community Primary School

Topic: Animals, including Humans	Year: 6	Strand: Biology

What I should know already:

- Which things are living and which are not.
- Classification of animals (e.g. amphibians, reptiles, birds, fish, mammals, invertebrates)
- Animals that are carnivores, herbivores and omnivores.
- Animals have offspring which grow into adults.
- The basic needs of animals for survival (water, food, air)
- The importance of exercise, hygiene and a balanced diet.
- Animals get nutrition from what they eat.
- Some animals have skeletons for support, protection and movement.
- The basic parts of the digestive system.
- The different types of teeth in humans.
- **Respiration** is one of the seven life processes.
- The life cycle of a human and how we change as we grow.

What I will know at the end of this unit:

What is the **circulatory system**?	• The **circulatory system** is made of the **heart**, **lungs** and the **blood vessels**. • **Arteries** carry **oxygenated** blood from the **heart** to the rest of the body. • **Veins** carry **deoxygenated** blood from the body to the **heart**. • **Nutrients, oxygen** and **carbon dioxide** are exchanged **via** the **capillaries**.
Choices that can harm the **circulatory system**	• Some choices, such as smoking and drinking alcohol can be harmful to our health. • Tobacco can cause short-term effects such as shortness of breath, difficulty sleeping and loss of taste and long-term effects such as lung disease, cancer and death • Alcohol can cause short-term effects such as addiction and loss of control and long-term effects such as **organ** damage, cancer and death
Why is exercise so Important?	Exercise can: • tone our muscles and reduce fat • increase fitness • make you feel physically and mentally healthier • strengthens the **heart** • improves **lung** function • improves skin

Vocabulary

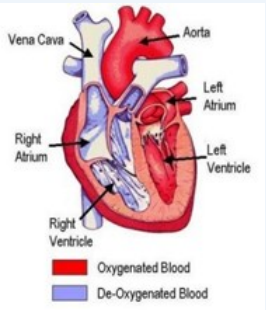
aorta	the main **artery** through which blood leaves your **heart**
arteries	a tube in your body that carries **oxygenated** blood from your **heart** to the rest of your body
atrium	one of the chambers in the **heart**
blood vessels	the narrow tubes through which your blood flows. **Arteries**, **veins** and **capillaries** are **blood vessels**.
capillaries	tiny **blood vessels** in your body
carbon dioxide	a gas produced by animals and people breathing out
circulatory system	the system responsible for circulating blood through the body, that supplies **nutrients** and **oxygen** to the body and removes waste products such as **carbon diox-**
deoxygenated	blood that does not contain **oxygen**
heart	the **organ** in your chest that **pumps** the blood around your body
lungs	two **organs** inside your chest which fill with air when you breathe in. They **oxygenate** the blood and remove **carbon dioxide** from it.
nutrients	substances that help plants and animals to grow
organ	a part of your body that has a particular purpose
oxygen	a colourless gas that plants and animals need to survive
oxygenated	blood that contains **oxygen**
pulse	the regular beating of blood through your body. How fast or slow your **pulse** is depends on the activity you are doing.
respiration	process of respiring; breathing ; inhaling and exhaling air
veins	a tube in your body that carries **deoxygenated** blood to your **heart** from the rest of your body
vena cava	a large **vein** through which **deoxygenated** blood reaches your **heart** from the body
ventricle	one of the chambers in the **heart**
via	through

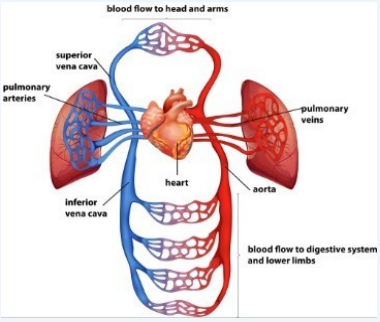
Investigation opportunities:

- How does your **pulse** change with exercise? What is the most efficient way of presenting this data?
- Which exercise produces the fastest **pulse**? How would you make this a fair test?

Diagram– The Circulatory System and the heart

1. The right **atrium** collects the **deoxygenated** blood from the body, **via** the **vena cava**. It sends the blood to the right **ventricle**.
2. The right **ventricle pumps** the **deoxygenated** blood to the **lungs**. Here the blood picks up **oxygen** and disposes of **carbon dioxide**.
3. The **lungs** send **oxygenated** blood back to the left **atrium** which pumps it to the left **ventricle.**
4. The left **ventricle** pumps the blood to the rest of the body, **via** the **aorta**.





The **heart** is composed of four chambers; the right **atrium**, the right **ventricle**, the left **atrium** and the left **ventricle**.

How often your **heart** pumps is called your **pulse**.

Finlay Community Primary School

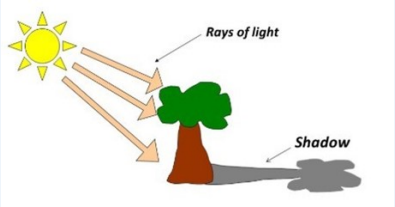
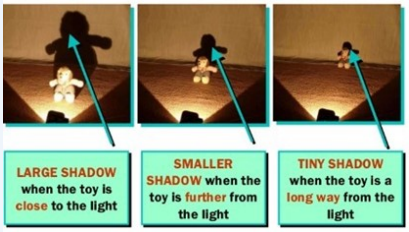
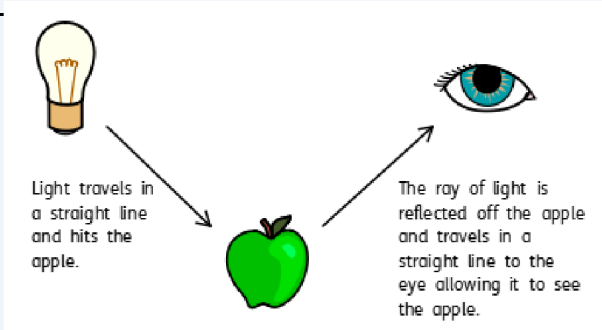
Topic: Light	Year: 6	Strand: Physics

What I should know already:

- Certain things produce **light**, usually by burning (e.g. the Sun) or **electricity** (e.g. street **lights**)
- Shiny materials do not make **light** but do reflect it.
- **Shadows** are caused when certain materials block **light**.
- **Light** travels in straight lines. When **light** is blocked by an **opaque** object, a **dark shadow** is formed.
- The further away the **light source** is, the smaller the **shadow** is. The closer the **source** of the light, the bigger the shadow.

Vocabulary	
angle	the direction from which you look at something
dark	the absence of **light**
dim	**light** that is not **bright**
electricity	a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for machines
emits	to **emit** a sound or **light** means to produce it
light	a **brightness** that lets you see things.
mirror	a flat piece of glass which **reflects light**, so that when you lookat it you can see yourself **reflected** in it
opaque	if an object or substance is **opaque**, you cannot see through it
reflects	sent back from the **surface** and not pass through it
shadows	a dark shape on a **surface** that is made when something stands between a **light** and the **surface**
source	where something comes from
surface	the flat top part of something or the outside of it
torches	a small **electric light** which is powered by batteries and which you can carry
translucent	if a material is **translucent**, some **light** can pass through it
transparent	If an object or substance is **transparent**, you can see through it

What I will know at the end of this unit:

How does **light** travel?	• **Light** travels in a straight line. • When you place a torch on a table in a **dark** room, the beam travels in a straight line. • **Reflection** is when **light** bounces off a surface - this changes the direction in which the **light** travels.
What is the relationship between **light sources** and **shadows?**	• Because **light** travels in straight lines, when there is an **opaque** object blocking the **light**, a **shadow** is formed. • These **shadows** have the same shape as the objects that cast them.  • The size of a **shadow** changes as the **light source** moves. 
How do we see?	

Investigation opportunities:

What happens when light is **reflected** from different **surfaces**? What happens when light is **reflected** from a **mirror**? What happens when the **angle** of the **mirror** (or **light source** changes?)
Draw diagrams to show how **light** travels and what happens when **light** is **reflected** from a **mirror.**
Draw diagrams to show how we see.

Design an experiment to measure **shadow** length by changing a variable. Show your results in a line graph to show the relationship between distance of **light source** and **shadow** length. Explain your findings using scientific vocabulary.
Create **shadow** puppets to show how **light** travels and to demonstrate that a **shadow** has the same shape as the object that casts them.
Make a periscope and explain how it works using diagrams and scientific vocabulary. Use the idea that **light** appears to travel in straight lines to explain how it works.
Research how **mirrors** are used in different contexts (e.g. rear view mirrors, on a dangerous bend) and explain why and how they work.
Explain why objects look bent in water.

Explore different contexts in which **light** travels including rainbows, colours on soap bubbles and coloured filters.

Finlay Community Primary School

Topic: Evolution and Inheritance	Year: 6	Strand: Biology

What I should know already:

- Which things are living and which are not.
- Identifying animals (e.g. amphibians, reptiles, birds, fish, mammals, invertebrates) and plants using classification keys Animals that are carnivores, herbivores and omnivores.
- Animals have **offspring** which grow into adults.
- The basic needs of animals for **survival** (water, food, air)
- Some animals have skeletons for support, protection and movement.
- Food chains, food webs and the role of predators and prey.
- Features of habitats and the animals and plants that exist there (**biodiversity**).
- Examples of different **biomes**
- The life cycle of some animals and plants
- Sometimes **environments** can change and this has an effect on the plants and animals that exist there
- Living things **breed** to produce **offspring** which grow into adults. This is called **reproduction**.
- The role of Mary Anning in **palaeontology** and the discovery of **fossils**.

Vocabulary

adaptation	a change in structure or function that improves the chance of **survival** for an animal or plant within a given **environment**
ancestor	an early type of animal or plant from which a later, usually dissimilar, type has **evolved**
biodiversity	a wide variety of plant and animal **species** living in their natural **environment**
biome	a large naturally occurring community of animals and plants occupying a major habitat
breeding	the process of producing plants or animals by **reproduction**
characteristics	the qualities or features that belong to them and make them recognisable
environment	all the circumstances, people, things, and events around them that influence their life
evolution	a process of change that takes place over many **generations**, during which **species** of animals, plants, or insects slowly change some of their physical **characteristics**
extinct	no longer has any living members, either in the world or in a particular place
fossil	the hard remains of a **prehistoric** animal or plant that are found inside a rock
generation	the act or process of bringing into being; through **reproduction**, especially of **offspring**
inherit	If you inherit a **characteristic** you are born with it, because your parents or **ancestors** also had it.
maladaptation	the failure to **adapt** properly to a new situation or **environment**
mutation	**characteristics** that are not **inherited** from the parents or **ancestors** and appear as new **characteristics**.
natural selection	a process by which **species** of animals and plants that are best **adapted** to their **environment** **survive** and **reproduce**, while those that are less well **adapted** die out
offspring	a person's children or an animal's young
palaeontology	the study of **fossils** as a guide to the history of life on Earth
reproduction	when an animal or plant produces one or more individuals similar to itself
species	a class of plants or animals whose members have the same main **characteristics** and are able to **breed** with each other
survive	continue to exist
theory	a formal idea or set of ideas that is intended to explain something
variation	a change or slight difference

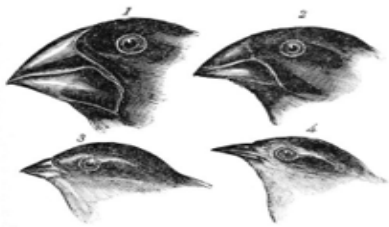
What I will know at the end of this unit:

What is the theory of **evolution**?	• **Evolution** is a process of change that takes place over many **generations**, during which **species** of animals, plants, or insects slowly change some of their physical **characteristics.** This is because **offspring** are not identical to their parents. It occurs when there is competition to **survive**. This is called **natural selection.** • Difference within a **species** (for example between parents and **offspring**) can be caused by **inheritance** and **mutations**. • Inheritance is when **characteristics** are passed on from generation to the next. • **Mutations** in **characteristics** are not **inherited** from the parents and appear as new **characteristics**.
How do we know about **evolution**?	• Evidence of **evolution** comes from **fossils** - when these are compared to living creatures from today, **palaeontologists** can compare similarities and differences. • Other evidence comes from living things - comparisons of some **species** may reveal common **ancestors**.
What is **adaptation**?	• **Adaptation** is when animals and plants have **evolved** so that they have **adapted** to **survive** in their **environments**. For example, polar bears have a thick layer of blubber under their fur to **survive** the cold, harsh **environment** of the Arctic while giraffes have long necks to reach the leaves on trees. • Some **environments** provide challenges yet some animals and plants have **adapted** to **survive** there • Sometimes **adaptations** can be disadvantageous, One example of this can be the dodo, which became **extinct** as it lost its ability to fly through **evolution**. Flying was unnecessary for the dodo as it had lived for so many years without predators, until its native island became inhabited. When adaptations are more harmful than helpful, these are called **maladaptation**.

Investigation opportunities:

- Research the work of Charles Darwin and Alfred Russel Wallace.
- Create a fact file of an animal or plant identifying how it has adapted to its **environment** and how it has **evolved** to **survive**.
- Create a new planet and describe the **environmental** features. What animals and plants can live there? How have they **adapted** to survive?

Diagram



Charles Darwin, an evolutionary scientist, studied different animal and plant **species**, which allowed him to see how **adaptations** could come about. His work on the finches was some of his most famous.