

Iceni Primary – Hockwold’s Long Term Science Plan

This plan has the National Curriculum objectives for each key stage and demonstrates clear progression and coverage in the form of activities related to the different scientific characters and the colours each one represents:

<p>Doctor I C (identifying and classifying)</p> <ul style="list-style-type: none"> • asking questions • identifying • scientific diagrams • classifying • looking at similarities and differences • recognising things • grouping things 	<p>Rachel Researcher</p> <ul style="list-style-type: none"> • asking questions • looking at current trends • answering questions • looking at new evidence • gathering scientific findings • analysing scientific findings • showing changes over time • using background information 	<p>Ozzy Observer</p> <ul style="list-style-type: none"> • asking questions • observing objects • looking at changes over time • observing events • making careful observations • collecting data from observations 	<p>Fiona Fair Test</p> <ul style="list-style-type: none"> • Asking questions • measuring variables • it is all about the 'test'! • Observing variables • looking at dependent and independent variables • concerned with only changing ONE variable 	<p>Peter Pattern</p> <ul style="list-style-type: none"> • asking questions • observing and recording natural phenomena • trying to make sense of the wider world • collecting specimens from the natural world • carrying out surveys • using measure • collecting data from different sources • looking at patterns from data • analysing secondary sources of data

This plan incorporates the foundations for conceptual understanding of the world and scientific knowledge through the specific disciplines of biology, chemistry and physics.

We want the children in all classes to record and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables. Can they interpret the data to answer the question? Can they suggest how they might improve their work if they did it again?



Each topic will start with time spent discussing what has previously been learnt and, how the current topic will build on previous learning

Progression and coverage is shown by looking for the coloured block throughout the year groups:

Plants	Green
Animals Including Humans	Pink
Materials	Orange
Seasonal Changes	Yellow
Living Things & Their Habitats	Purple
Light	White
Forces & Magnets	Grey
Sound	Dark Blue
Rocks	Black
Electricity	Red
States of Matter	Light Blue
Earth & Space	Light Green
Evolution & Inheritance	Brown



Key Stage 1 Information from NC

Working scientifically

Statutory requirements

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

Notes and guidance (non-statutory)

Pupils in years 1 and 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.

These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.

School Based EYFS Assessment:

Science
I can talk about different materials and say for example why bricks are used to build houses.
I can talk about how materials can change, for example ice.
I can say where light comes from.
I can explain how a shadow is made.
I know what animals (including humans) need to survive.
I know animal baby names and can talk about where they live and who their parents are.
I can name some of the natural things around me
I can say what plants needs to grow
I can describe the life cycle of a chick and butterfly

What are we learning in Willow Class? Year 1

Categories	Plants 	Animals inc humans  	Materials   	Seasonal Changes    
NC Objectives	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p>	<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals inc pets)</p> <p>Identify, name, draw & label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p>Distinguish between an object and the material from which it is made.</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p> <p>Describe the simple physical properties of a variety of everyday materials.</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p>	<p>Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p>



<p>Activities</p>	<p>As part of Pirates topic/CP Learn the names and features of plants and trees including different parts of a plant. Looking at similarities/differences. Visit to BCP. Find the types of trees in our local area. Asking Q and explaining possible answers of which plants will grow the quickest or tallest from a selection of 3 (cress, bean, sunflower) Explaining a fair test when growing the plants. Answering Q about which one will grow the quickest Trying to make sense of the wider world Carrying out surveys of the different flowering parts in our local area. Learning names of flowers in the local area. Using magnifying glasses to compare and contrast</p>	<p>As part of All About Me & Go Wild topic/CP Sort different species into fish, amphibians, birds and mammals and whether they are carnivores, herbivores and omnivores. Use a simple classification key. Look at the changes in different stages of human life from baby to old age. Draw around their body and label body parts. Learn how to look after your body to stay healthy – interview a Dr, make a leaflet. Perform a senses test. (what can they find out by watching, listening, tasting, smelling, touching?) Learn all about Linda Brown Buck – she discovered that mammals can smell over 10,000 smells</p>	<p>As part of Marvellous Materials/ GFoL topic/CP Group the materials and objects to show an understanding of which objects the materials come from. Planning and making a bug hotel – explain why a particular material has been chosen. Look at how materials change when cooled, such as making jelly. Predict and evaluate. Collecting data, putting it into a chart or table to explain how the different materials feel. Decide on which would be the best ball to knock a house down in a fair test. Link to GFoL and the houses being knocked down. Sorting different materials and where they come from. Describe a material using their sense.</p>	<p>As part of Pungent Pirates & Marvellous Materials topic/CP Sort clothes to wear in different weathers. (waterproof, warm, cool) Draw the four seasons. Looking at changes over the different seasons. Describing the difference to trees during the four seasons. Asking Q & explaining a fair test. When trying to see the best waterproof material. Make a rain maker.</p>
<p>Tier 2 Vocab</p>	<p>Plant, leaf, grow, change, living, water, flower, roots, stem, soil.</p>	<p>Compare, describe, similar, different, baby, adult, changes, growing, ears, senses, hearing, touch, sight, smell, taste, mammals.</p>	<p>Glass, wood, metal, plastic, water, rock, hard, soft, breaks, tears, water, ice, melts.</p>	<p>Wind, rain, sun, storm, rainfall, measure, summer, autumn, winter, spring.</p>
<p>Tier 3 Vocab</p>	<p>Evergreen, deciduous, trunk, bark, pollen, damp, shady, observation, investigate, blossom, petals.</p>	<p>Patterns, measure, record data, predict, centimetre, millimetre, classify, identify, adolescents, observe, investigate, vertebrate, similarities, differences, amphibians, reptiles.</p>	<p>Transparent, opaque, dense, rough, smooth, magnetic.</p>	<p>Forecast, prediction, precipitation, wind direction, gauge, thermometer, lightweight, weatherproof.</p>
<p>PROGRESSION AND SEQUENCING-From EYFS</p>				
	<p>Recognise some environments are different from the one where they live. Compare the natural world around them. Plant seeds and take care of growing plants.</p>	<p>Describe what they see, hear & feel when outside. Understand the key features of a life cycle of plant & animal. Begin to understand the need to respect living things & environment.</p>	<p>Talk about the differences between materials. Use senses in hands on exploration of natural materials Explore collections of materials with similar/different properties.</p>	<p>Understand the effect of the changing seasons on the natural world.</p>
<p>Autumn 2. Recapping on science learnt in EYFS</p>	<p>Standalone sessions during Terrific Transport: Life cycles of plants and animals</p>			

What are we learning in Elm Class? Year 2

Science Categories	Plants	Animals inc humans	Materials	Living Things & Their Habitats
<p>NC Objectives</p>	<p>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 grow and stay healthy.</p>	<p>Notice that animals, including humans, have offspring which grow into adults.</p> <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</p>	<p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p>	<p>Explore & compare the differences between things that are living, dead and things that have never been alive.</p> <p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</p> <p>Identify & name a variety of plants and animals in their habitats, including microhabitats.</p> <p>Describe how animals obtain their food from plants & other animals, using the idea of a simple food chain & identify & name different sources of food.</p>
<p>Activities</p>	<p>As part of Where in the World? & We are Zoologists topics</p> <p>Identify plants by using a specific criteria. (shape of leaves, blossom)</p> <p>Life cycles of a plant with seeds. Grow plant from seeds.</p> <p>Ask questions, make a prediction and collect data of what a plant needs to grow.</p> <p>Fair test on growing a plant by removing either light, food or warmth.</p> <p>Use diagrams, pictures, charts, tables to record observations.</p> <p>Learn about Jane Colden – first woman botanist</p> <p>NOTE FROM NC: seeds & n bulbs need water to grow but most do not need</p>	<p>As part of We are Zoologists & Under the Sea topic</p> <p>Organise animals into basic groups and explain why. What do all of these animals need to survive?</p> <p>Life cycles of different animals & humans. (start by recapping on chicks, frogs from EYFS)</p> <p>Observe animals and humans to understand more about their basic needs – what they need to survive and how they use water, food and air in their bodies.</p> <p>Identifying fats in different foods (KWi to support) test or using senses and making it a fair test – what does fair test mean? What would make it not a fair test?</p> <p>Identify animals by using a specific criterion (lays eggs, has feathers)</p> <p>Researching information on healthy diets and producing information for others.</p>	<p>As part of the Hockwold & Beyond topic (Which materials are used in our local area?)</p> <p>Understand that materials can be used for different things (metal table legs, cars etc)</p> <p>Compare different & similarities of physical properties.</p> <p>Use a classification key.</p> <p>Use evidence overtime to see how materials used for buildings has changed.</p> <p>Make careful observations on experiments of how materials can be changed by squashing, bending, twisting & stretching.</p> <p>Perform a simple test to see how materials change when squashed etc.</p> <p>Use data information to help them decide on the best material to use for a</p>	<p>As part of the Zoologists and Where in the World? Topics</p> <p>Using a classification key to identify which things are living, dead and things that have never been alive in our local area.</p> <p>Investigate the habitats of living things and look for similarities and differences. (seashore, woodland, rainforest)</p> <p>Make a prediction of micro habitats for some living things (plants and animals) in our local area and then observe.</p> <p>Understand how a simple food chain works and then make their own.</p> <p>Identify and name different sources of food</p> <p>Discuss habitats inc differences and similarities and the basic needs to survive and why some animals and plants are suited to a certain type of habitat. (Animals & humans)</p>



LTP for Science 2024 onwards



	light: they have a store of food inside them.	Cooking a healthy meal. Learn about Louis Pasteur – discovered that germs are living things	particular job: to prevent an egg from breaking when dropped from height. (You can introduce independent and dependent variables with this experiment) Learn about Charles Mackintosh – invented first waterproof fabric	Grow different vegetables based on suitable habitat in our area.
Tier 2 Vocab	Seed, bean, bulb, water, light, dry, wet, moist, growth, leaves, stem, roots, planting, edible, harvest, wash cook, energy.	Air, feeds, grows, waste, damp, wet, dry, light, ocean, water, minibeasts, heart, lungs, breathing, blood, hygiene, healthy, unhealthy, exercise.	Material, strong, weak, melting, burning, change, shape, twist, strong, stiff, rip, tear, weight.	Living, dead, never been alive, habitats, local environment, survival,
Tier 3 Vocab	Pollination, disperse, nutrients, warmth, predict, germination, produce.	Classification, reproduces, rainforest, dependence, edible.	Transparent, opaque, flexible, rigid, absorbency, hypothesis, resist, results, particles.	Microhabitat, food chain, consumers, herbivore, omnivore, carnivore.
Standalone sessions	Autumn 2: Carnivores, herbivores and omnivores- Recapping from year 1 Spring 1: Deciduous and Evergreen trees – Recapping on from year 1			



Lower KS2 Information from NC

Working scientifically

Statutory requirements

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Notes and guidance (non-statutory)

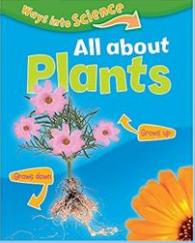
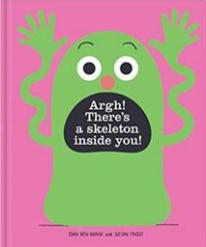
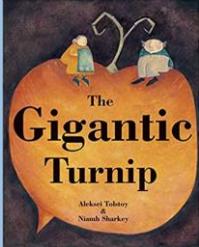
Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.

Notes and guidance (non-statutory)

They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.

These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study.

What are we learning in Beech Cycle A? Years 3/4

Science Categories	<p>Plants</p>   	<p>Animals inc humans</p>  	<p>Light</p>   	<p>Forces & magnets</p>    	<p>Sound</p>  
<p>NC Objectives</p>	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.</p> <p>Investigate the way in which water is transported within plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>	<p>Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>	<p>Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</p> <p>Find patterns in the way that the size of shadows change.</p>	<p>Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or</p>	<p>Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.</p>



				repel each other, depending on which poles are facing.	
Activities	<p>As part of the How Does Your Garden Grow? Topic</p> <p>Classify a range of common plants according to criteria agreed by the group.</p> <p>Understand the process of pollination, seed formation and seed dispersal. Draw diagrams to understand this process.</p> <p>Experiment with paper helicopters.</p> <p>Investigate the way in which water is transported within plants. (Cut, white carnations in coloured water)</p> <p>Can they explain how the weather, people, environment can affect living things?</p> <p>Recap on the requirements of plants for life and growth and variations from plant to plant (Keep a cactus and fuchsia – identify sim & diff and how long they last without water etc)</p> <p>Identify and describe the functions of parts of flowering plants: roots, stem/trunk, leaves, flowers.</p>	<p>Standalone within Ruthless Romans topic</p> <p>Identify the skeletons and muscles and that they are used for support, protection and movement. Investigate how they move. Skeleton in class.</p> <p>Group animals into herbivore, carnivore, omnivore to recap.</p> <p>Ask questions as a group and look at similarities and differences between skeletons of humans & animals. Look at those with and without skeletons.</p> <p>Understand how the body has changed over time.</p> <p>Design a fair test to show how our body works (throwing a ball into a bucket and change one thing, such as covering the eyes, using one hand)</p> <p>Identify that animals, including humans, need the right types and amount of nutrition and that they cannot make their own food; they get nutrition from what they eat.</p> <p>Design and cook a healthy meal based on what you have learned.</p> <p>Learn about Marie Curie – xray</p>	<p>As part of the See Hear! Topic</p> <p>Explore how light is reflected and behaves, using mirrors to support our theories.</p> <p>Predict, ask questions and evaluate how shadows are formed.</p> <p>Understand how we see light and how we protect our eyes from the sun.</p> <p>Recognise that we need light to see things and dark is the absence of light. Experiment with this, predicting and writing up findings.</p> <p>Explain the difference between transparent, translucent and opaque. Predict certain materials as to whether they are transparent, translucent or opaque and test</p> <p>Understand how it is light in some parts of the world but dark in others over the course of 24 hours.</p>	<p>Standalone within Groovy Greeks topic</p> <p>Group a set of everyday materials based on whether they are attracted to magnets or not.</p> <p>Observe how magnets can attract or repel each other and attract some materials and not others.</p> <p>Observe how magnetic forces can be transmitted without direct contact.</p> <p>Predict, ask questions and evaluate your findings. Add in the strength of magnets and repeat.</p> <p>Compare how things move on different surfaces, for example which shoe has the best grip. Creating a fair test.</p> <p>Explain why you need to collect information to answer a question.</p> <p>Describe magnets as having 2 poles and what this means.</p> <p>Learn about Sir Isaac Newton</p>	<p>As part of the See Hear! Topic</p> <p>Find patterns & classify between the pitch of a sounds and features of the object- that produced the sound. (Saucepan lids, elastic bands, glasses with water in)</p> <p>Classify instruments based on the sound and pitch</p> <p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Learn how the ear works and that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Predict what happens to sounds as you move away from it – fair test.</p> <p>Investigate what the best ear defenders should be made from for a builder. (Insulating the sounds)</p> <p>Learn about Alexander Graham Bell – invented the telephone</p>
Tier 2 Vocab	<p>Petals, reproduction, male, female, pollination, fertilisation, fruit, pot, seeds, nut, berry, head, parent, investigate, fair test, record, results.</p>	<p>Teeth, jaw, evidence, digestion, chew, spit, question, digestion, mouth, gullet, stomach, diet, food chain.</p>	<p>Force, push, pull, theory, fair test, investigate, measure, gravity, contact, magnet, magnetism, time.</p>	<p>Force, push, pull, theory, fair test, investigate, measure, gravity, contact, magnet, magnetism, time.</p>	<p>Sound, listen, hear, ears, noise, loud, quiet, silent, air, water, solid, volume, loudness, investigation, prediction, results, evaluate, conclusion.</p>
Tier 3 Vocab	<p>Botany, botanist, botanical, stigma, style, stamens, ovary, ovules, carpel, dispersal, germination</p>	<p>Incisors, molars, canines, saliva, digestive system, nutrition, oesophagus, small intestine, large intestine, rectum, anus, faeces, herbivore, carnivore, omnivore, producer, prey, consumer, impact.</p>	<p>Non-magnetic, attraction, repel, repulsion, north/south, spectrum, refraction, reflector, predict, concave, convex, translucent, opaque.</p>	<p>Non-magnetic, attraction, repel, repulsion, north/south, spectrum, refraction, reflector, predict, concave, convex, translucent, opaque.</p>	<p>Vibrations, transmit, medium, source, soundwaves, particles, travel, amplitude, pitch, frequency, sign language, factor, variable, muffle.</p>

Standalone in autumn 2 and spring 2	Autumn 2: Recap on space during one afternoon to prepare children for upper KS2 space. Learn the names of the planets and their features. Spring 2: Recap on herbivores, omnivores and carnivores- differences and similarities
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What are we learning Beech Class Cycle B? Years 3/4					
Science Categories	Living things & their habitats	Animals inc Humans	Rocks	Electricity	State of matter
NC Objectives	<p>Recognise that living things can be grouped in a variety of ways.</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p>	<p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter.</p>	<p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p>	<p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>
Activities	<p>Standalone withing Stars & Stripes topic</p> <p>Decide as a group how to classify a group of living things. Explain your reasoning.</p> <p>Develop a classification key to explain the groupings to others. Start to learn about vertebrates and invertebrates when classifying.</p> <p>Research and produce a guide to show the living things in our community.</p>	<p>As part of the Biological Bodies topic</p> <p>Research and draw to show how the digestive system of a human works. Build into a 3d plan using a kit if possible. (mouth, tongue, teeth, oesophagus, stomach, small & large intestine)</p> <p>Identify the different teeth in humans and their functions.</p> <p>Discuss how to look after teeth and what damages them.</p>	<p>As part of Time Detectives and Fascinating Fieldwork topic</p> <p>Compare & group together rocks on their physical properties. Explain the difference between sedimentary and igneous rocks and how they are formed and classify.</p> <p>Look at different types of rocks such as flint, gravestones and discuss how they have changed over time.</p> <p>Describe how fossils are formed and which animals they come from.</p> <p>Recognise that soils are made from rocks with organic matter. Investigate how soil is made.</p>	<p>Standalone within Exciting Egypt topic</p> <p>Recap on common appliances that run on electricity.</p> <p>Construct a simple electrical circuit using a bulb and name each part.</p> <p>Identify whether the lamp is part of the complete loop with the battery and that is what makes it light or not.</p> <p>Identify what make the light brighter. (more cells)</p> <p>Identify what a switch does to the circuit (opens and closes it)</p>	<p>As part of the What Does it Matter? Topic</p> <p>Compare and group materials together, according to whether they are solids, liquids or gasses. At Methwold.</p> <p>Observe that some materials change state when they are heated or cooled and measure or research the temperature at which this happens. (chocolate, butter)</p> <p>Collect and analyse data from all observations – what does this tell you?</p> <p>Conduct a fair test on ice melting, changing one variable only and predicting which one will melt first.</p>



	<p>Include the vocabulary that has been used. Explore the work of Carl Linnaeus. Discuss and look at possible other ways to classify. Investigate how the environments changing can sometimes pose dangers to living things.</p>	<p>Construct a variety of food chains, identifying producers, predators and prey. Make a classification key to help others identify these. Compare the teeth of herbivores, carnivores and omnivores and suggest why they are different. Interpret the findings by asking what the difference job is of the producer, predator, prey and what would happen if they were not part of the food chain. Research using secondary evidence.</p>	<p>Predict what will happen when rocks are rubbed together or in water. Use a microscope to identify whether the rocks have grains or crystals in and reclassify. Look at fossils using first/secondary evidence.</p> <p>Learn about William Smith – geologist</p> <p>Link to geography and exploring rocks and soils in our local environment – buildings and gravestones.</p>	<p>Investigate different metals to see which are the best conductors – fair test. Predict. Explain why caution is needed when working with electricity – safety aspects.</p> <p>Learn about Thomas Edison</p>	<p>Look at evaporation and condensation in the water cycle and look at how this is linked to temperature. Set up an experiment to look at when water evaporates – At Methwold using Bunsen burners changing the volume of water.</p> <p>Learn about Antoine Lavoisier and Joseph Priestley mainly responsible for the discovery of oxygen</p>
Tier 2 Vocab	<p>Alive, dead, movement, reproduction, growth, habitat, natural, man-made, observation, record, group, similar, different, explore.</p>	<p>Diet, food chain, data, table, bar, growth, repair, energy, bone, skeleton, ribcage, pelvis, muscles, joint, lungs, investigate, measure, compare, nutrition.</p>	<p>Rocks, natural, man-made, brick, tile, concrete, acid, survey, data, fossil, mould, cast, soil, micro-organisms, compare, predict.</p>	<p>Electricity, switch, battery, plug, mains, wire, crocodile clip, buzzer, power, danger, safety, closed, open, socket, appliance, flow.</p>	<p>Solid, liquid, state, matter, gasses, evidence, questions, discuss, gas, proof, explain, ice, rain, snow, clouds, vapour, cycle, change, freezing, melting</p>
Tier 3 Vocab	<p>Classify, sensitivity, nutrition, excretion, respiration, vertebrate, invertebrate, arachnid, branching database, variety, key.</p>	<p>Herbivore, carnivore, omnivore, carbohydrate, proteins, dairy, fats, sugars, vitamins, minerals, fibre, relax, contract, biceps, triceps, diaphragm, lung capacity.</p>	<p>Sandstone, limestone, chalk, granite, slate, marble, classification, observation, petrologist, igneous, sedimentary, metamorphic, permeable, impermeable, erosion, identification key, ichthyosaur, plesiosaur, ammonite, organic matter, particles.</p>	<p>Circuit, connection, cell, electrocute, device, current, conductor, insulator, parallel, series.</p>	<p>Classify, particle, grain, category, solidifying, condensing, evaporating, thermometer, temperature, Celsius, Fahrenheit, degrees, precipitation, transpiration.</p>



Upper KS2 Information from the NC

Working scientifically

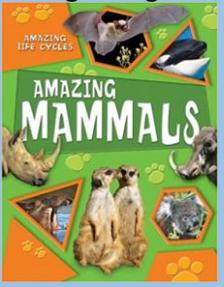
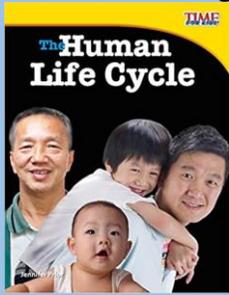
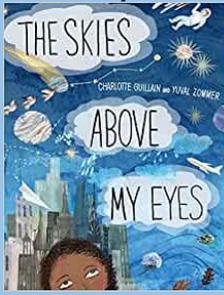
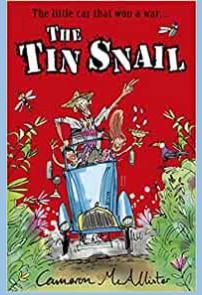
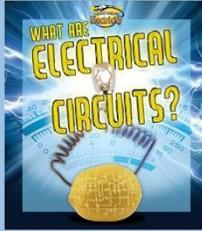
Statutory requirements

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.

Notes and guidance (non-statutory)

Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.

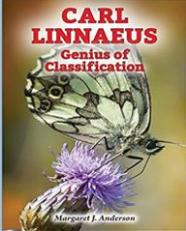
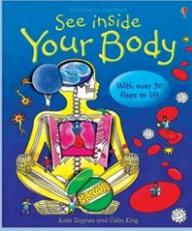
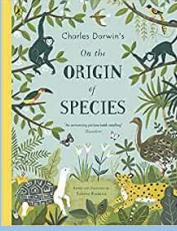
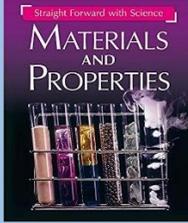
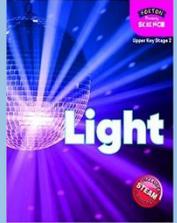
What are we learning Oak Class Cycle A? Years 5/6					
Science Categories	Living Things & their Habitats   	Animals including Humans  	Earth & space    	Forces  	Electricity  
NC Objectives	<p>Describe the differences in the life cycles of a mammals, an amphibian, an insect and a bird. Describe the life processes of reproduction in some plants and animals</p>	<p>Describe the changes as humans develop to old age.</p>	<p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction that act between moving surfaces. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p>	<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram.</p>
Activities	<p>As part of the Circle of Life and Location, Location, Location topic. Investigate the life cycles and make a classification key to show differences & similarities between mammals, amphibian, insects & birds. Test the key out on peers. Compare life cycles of plants in local environment with those in the rain forest. Ask questions to peers about similarities & differences of the species.  Pollinating Lilly plants to see the sexual reproduction (Methwold to support) Present findings to others. Learn about the work of David Attenborough/ Jane Goodall.</p>	<p>As part of the Circle of Life topic Create a timeline to indicate stages in growth and development of humans. Research and describe the changes experienced in puberty Learn about Alexander Flemming – discovered first antibiotic</p>	<p>As part of the Earth & Space topic Name the 8 planets and the dwarf planet. Describe the movement of the Earth and other planets, relative to the sun in the solar system. Make a solar system. Describe the movement of the moon relative to the Earth. Investigate and explain to others day and night in relation to the Earth, sun and moon. Make shadow clocks or sundials and watch changes over time. Explain how the seasons and associated weather is created. Explore the work of Ptolemy or Alhazen or Copernicus. Investigate how Stonehenge was used to make astronomical clocks  </p>	<p>Standalone within the WW2 topic Try to defy gravity! Recognise that some mechanisms including gears, levers and pulleys allow a smaller force to have a greater effect – experiment led by Methwold Agree on the unit of measure you will use to record answers. Devise a fair test to time different objects falling and classify similarities and differences. (parachutes from different material) Identify the effects of air resistance, water resistance and friction that acts between moving surfaces. Making boats of different shapes or cars that move in different strengths of wind. Or make plasticine shapes and drop them through Teepol solution – support from Methwold Learn about Stephen Hawkin</p>	<p>As part of WW1 topic. Recap on circuit making. Use recognised symbols when representing a simple circuit in a diagram. Understand and make a tapper to understand Morse code. Record data and results using diagrams, labels, line graphs. Present findings to class. Investigate how to make the buzzer louder/bulb brighter, what happens when the length of wires are increased and what changes are needed. Include understanding of voltage. (Could do this at Methwold to provide extra opportunities)  Make a traffic light system. Research and share the dangers of short circuits. Research what a fuse is.</p>



LTP for Science 2024 onwards



			Learn about Mae Jemison – first woman in space		Research the major scientists in the field of electricity.
Tier 2 Vocab	Classification, species, similarities, differences, reproduction, pollination, life cycle, ovary, style, stamen.	Adolescent, old age.	Earth, planets, sun, solar system, moon, rotate, spin, orbit, opinion, support, axis, sundial, telescope, satellite, tide, mass, gravity, Mercury, Venus, Mars, Just Saturn Uranus, Neptune, Pluto.	Support, fall, earth, gravity, force, weight, investigate, mechanisms, levers, pulleys, parachutes. Research, Newton.	Electricity, electrical circuit, components, battery, positive, negative, connection, wire, crocodile clip, investigation, metal.
Tier 3 Vocab	Vocabulary linked to RSHE topic	Vocabulary linked to RSHE topic	Celestial body, sphere, spherical, dwarf, heliocentric models, geocentric models, astronomical, variables, Greenwich meantime, gnomon time-zone.	Air resistance, water resistance, friction, balancing, force, Newton, variables, accuracy, precision, transfers.	Voltage current, conductor, insulator, terminal resistance.

What are we learning in Oak Cycle B? Years 5/6					
Science Categories	Living things & their habitat	Animals including humans	Evolution & Inheritance	Properties & changes of materials	Light
	 	 	 	 	 
NC Objectives	<p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p> <p>Describe the differences in the life cycles of a mammals, an amphibian, an insect and a bird.</p> <p>Describe the life processes of reproduction in some plants and animals</p>	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p>	<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>	<p>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.</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p>	<p>Recognise that light appears to travel in straight lines.</p> <p>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</p> <p>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>
Activities	<p>As part of Amazing Antarctica topic</p> <p>Introduce the Linnaean system of classification and use this to classify. (Carl Linnaeus)</p> <p>Move from Linnaean system to create a classification key for mammals, birds, insects, reptiles, amphibians, fish, arachnids, annelids, crustaceans, echinoderms and molluscs.</p> <p>Investigate and describe the differences in life cycles of an</p> 	<p>As part of the Healthy Bodies topic</p> <p>Research and name the main parts of the human circulatory system and describe the function of the heart, blood vessels and blood.</p> <p>Pose hypotheses relating to this, such as testing increase in heart rate when doing different exercises and record data using tables, scatter graphs, conclusions.</p> <p>Follow a set of instructions to demonstrate how blood pumps around the circulatory system.</p>	<p>As part of The Evolution Effect topic</p> <p>Understand that living things produce offspring of the same kind but normally offspring are not identical to their parents – look at similarities and differences.</p> <p>Research what fossils have told us about changes over time.</p> <p>Understand the term adaptation and how this applies to certain species.</p> <p>Provide examples of how some living things have adapted in extreme living conditions.</p> 	<p>Standalone within Islamic Civilisation topic</p> <p>Compare & classify everyday materials based on hardness, solubility, transparency, conductivity and response to magnets.</p> <p>Test how some materials dissolve in liquid to form a solution (caster and granulated sugar) and recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gasses to devise an experiment</p> 	<p>Standalone within 20th C topic</p> <p>Recognise that light appears to travel in straight lines</p> <p>Explain the working of the eye and light/reflection. Use a model of the eye.</p> <p>Design an experiment to show how shadows work and how light is used.</p> <p>Make a periscope using the idea that light travels in straight lines.</p>



LTP for Science 2024 onwards



	<p>amphibian and an insect (metamorphosis) Investigate harmful and helpful micro-organisms. ■ Group organisms found in local habitat.</p>	<p>Understand the benefits of exercise on the different parts of the body. Recognise the impact of diet as well as exercise on the body. Look at how drugs affect the body. Describe the way in which nutrients, water are transported within animals inc humans. Investigate the impact of diet, exercise- and lifestyle on the way their bodies function.</p>	<p>Eva Crane's research on bees and their importance to our existence. Learn about Charles Darwin</p>	<p>of how mixtures might be separated through sieving or evaporating. (filtration) Separating mixtures (play sand, raisins, flour, rice, salt) At Methwold. Reverse an action that you have changed and explain how this happened using solids, liquids or gases as changing states. Investigate chemical changes when cooking, such as baking bread. What happens to the ingredients? Irreversible changes (Twinkl, year 5) Learn about the work of Spencer Silver/Ruth Benerito and present findings to others.</p>	<p>Look at a range of phenomena including rainbows, colours on soap bubbles – explain what they have observed. Use an independent variable. Research & explain that objects are seen because they give out or reflect light into the eye.</p> <p>L</p>
Tier 2 Vocab	Life cycle, insect, classification, habitat,	Blood, vessels, heart, pumps, exercise, lifestyle, arteries, oxygen.	Lungs, nutrients, water, lifestyle, alcohol, drugs, environment,	Transparency, magnetism, properties, dissolve, separation, solids, liquids, gases.	Light source, dark, reflect, negative, mirror, shadow, block ,absorb, direction, straight, investigate, demonstrate, opinion, fact, properties, enquiry, material, support, rainbow
Tier 3 Vocab	Amphibian, metamorphosis, Linnean system, crustaceans, echinoderms, molluscs, conservation.	Circulatory system, depressant, hallucinogen.	Adaptation, mutations, characteristics, inheritance, environmental variation	Solubility, conductivity, reversible, irreversible, filtration.	Transparent, opaque, translucent, periscope, refute, accuracy, precision, insulator, conductor. Reversible, irreversible.
Standalone sessions during Spring 2	Within Beautiful Biomes children will complete a KS2 based unit covering many science subjects and will go over any incorrect questions as a result.				



Resources available in the Secure cupboard

Plants/living Things & Their Habitats/Evolution & Inheritance/Animals inc Humans	Electricity/Light/Sound	Materials/Forces/Rocks	Earth/Space	Other
Bug viewer Model skeleton x 2 Human torso Pumping heart model Plant in a pocket Incubator Heat lamp	Mini light & shadows Electrical circuit making kit Light & sound kit	Push/pull string balance Friction ramp Large magnets Rocks Minerals Water balloons Red parachute	Motorised solar system Inflatable solar system	Microscopes to link to ipad Vices, clamps etc Bulldog clips Clipboards Scales Syringes Tubing Measuring wheels Plastic straws Measuring cylinders Polydron



Powerful Knowledge and Skills for All Year Groups

YEAR 1

Plants	I can name the parts of plant.
	I can sort trees - deciduous and evergreen.
	I can use observations.
	I can explain a fair test.
Animals inc Humans	I can sort animals into fish, amphibians, birds and mammals.
	I can sort animals according to diet, carnivores, herbivores and omnivores.
	I can name and label body parts.
	I can recognise ways to keep healthy.
	I can carry out an investigation (senses experiment).
	I can recognise changes in different stages of human life.
Materials	I can name, describe and sort materials.
	I can say why materials are chosen to make objects (bug hotel).
	I can observe how materials change (jelly).
	I can collect data and record results using a chart/table.
Seasonal Changes	I can sort clothes suitable for different weathers.
	I can name the four seasons and how they change.
	I can explain why it is important to have fair test.
Scientists	I can tell you about a famous scientist.



YEAR 2

Plants	I can say what a plant needs to grow and identify parts of a plant.
	I can recall the life cycle of a plant.
	I can make a prediction.
	I can explain an example of a fair test.
	I can use diagrams and charts to record my findings.
Animals Including Humans	I can categorise animals into groups and explain why I have done it that way.
	I can draw a life cycle of a human and animal.
	I know what a healthy diet is and advise others.
Materials	I can say what materials are used for in buildings now, and in the past.
	I can create a simple test.
	I can test materials and observe the changes.
	I can make decisions based on data I have found.
Living Things & their Habitats	I can classify into dead, living and never lived.
	I can say what a habitat is and explain the differences and similarities between habitats.
	I can explain what a food chain is.

Scientists	I can tell you about a famous scientist.
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YEAR 3/ 4

Plants	I can group classify common plants and explain why there are variations in plants.
	I know the functions of different part of a plant and what they use as food.
	I can explain plant life cycles and reproduction.
	I can explain how water is transported through a plant.
	I can identify different types of seed distribution.
Animals inc Humans	I can categorise animals according to their backbones and skeletons.
	I can categorise animals according to their diet & habitat.
	I can read and use a key
	I can explain how what a healthy diet is and why it is important.
	I can read a food chain and explain it.



	I know how the human digestive system works.
	I can explain the functions of the different types of teeth.
	I can compare different food chains.
	I can use secondary research to investigate.
Light	I know the difference between natural and artificial light.
	I can explain how light is reflected.
	I know the difference between artificial and natural light sources.
	I can explain what shadows are and how they are made.
	I know how to keep my eyes safe from the sun.
	I know that humans need light to be able to see.
	I can investigate the difference between transparent, translucent and opaque.
Forces & Magnets	I know how day and night happens over the world.
	I can group and categorise objects: <ul style="list-style-type: none">• magnetic• non-magnetic
	I can investigate what happens to different materials when next to a magnet.
	I know what the poles on a magnet are.
	I can investigate what happens to objects when dropped (gravity).
	I can test how things move over different surfaces. I can test friction.
Sound	I can make my tests fair and explain how it is fair.
	I can investigate loud sounds and quiet sounds, those near and far away.
	I can investigate how different musical instruments make different sounds.
	I can classify sounds according to pitch.
	I know how the ear works.
Living Things & Their Habitat	I can investigate materials that can block sounds.
	I can classify and group different living things, inc those in my local area.
	I can read and create classification keys.
	I can explain some different food chains.
Rocks	I can compare three different habitats in my local area.
	I can research different habitats around the world.
	I can categorise and compare different kinds of rocks and soils.
	I know how different kinds of rocks formed.
	I can investigate how rocks can change over time:



	<ul style="list-style-type: none">erosionpermeability
	I can look closely at rocks to investigate for crystals, grains.
	I know what fossils are and how they are formed.
Electricity	I know the difference between appliances that are powered by batteries and mains electricity.
	I can construct a simple circuit.
	I can use a bulb and battery in a simple circuit.
	I can explain how a circuit works.
	I can investigate different metals that can be conductors of electricity.
	I can create and explain a fair test.
	I know what happens when a circuit is broken.
States of Matter	I can compare and group materials according to their properties (solid, liquid, gas).
	I know that materials can change state when heated or cooled.
	I can research the three different states of water.
	I can investigate reversible and irreversible changes when heat is added.
	I can explain: <ul style="list-style-type: none">evaporationcondensation
	I can observe what happens when ice melts.
Scientists	I can tell you about a famous scientist.



YEAR 5 /6

Living Things & their Habitat	I can describe life cycle of a mammal, amphibian and insect and describe their differences and similarities
	I can explain life processes of reproduction in plants
	I can make a classification key and explain why it is useful.
	I can classify into broad groups according to common observable characteristics
	I know who Carl Linnaeus is and what the Linnaean system is for classification
	I can investigate and explain the difference between harmful and helpful micro-organisms
	I can group organisms found in local habitat
	I can describe changes experiences in puberty
	I can describe the main parts of human circulatory system
	I can describe functions of heart, blood vessels and blood
	I can explain the impact of diet and exercise on our body
	I can explain ways nutrients and water are transported around body
I can explain the impact of drugs on our body	
Earth & Space	I can describe movement of the Earth, Sun and Moon relative to each other
	I can name the planets and in relation to the Sun
	I can explain day and night based on Earth's rotation
	I can research work of astronomers and explain why their work is important to us.
Forces & Magnets	I can explain what gravity is
	I can explain the effect of air resistance
	I can explain the effect of friction acting between moving surfaces
Electricity	I can experiment with the associate brightness of a lamp or volume of buzzer with number and voltage of cells
	I can give reasons for variations in how components function
	I can use recognised symbols in a simple circuit diagram
	I can make a traffic light system
Evolution & Inheritance	I can recognise living things have changed over time
	I can explain how fossils provide information about living things from millions of years ago
	I can explain that living things produce offspring of the same kind but normally offspring vary
	I can explain how animals and plants adapted to be able to survive in extreme conditions
Properties & changes of materials	I can group materials together using my own classification key.
	I can describe materials' response to magnets
	I can predict what will 'dissolve' and 'evaporate' and explain the difference.
	I can explain 'filter' and 'sieving'
	I can explain solids, liquids and gases



LTP for Science 2024 onwards



	I can explain and carry out comparative tests
	I can predict reversible and irreversible changes and plan an experiment to prove my prediction
	I can explain how materials change - reversing an action
	I can present my findings in an oral presentation using graphs/charts to show data analysis
Light	I can explain how light appears to travel in a straight line
	I can explain how objects are seen as they reflect light into the eye
	I can explain how we see things because light travels from light sources to our eyes OR light sources to objects and then to our eyes.
	I can explain the workings of an eye
	I can design and make a periscope
	I can research and explain phenomena e.g. rainbows
Biomes	I can tell you what a biome is and describe at least 2 of them.

Scientists	I can tell you about a famous scientist.
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