

St. John's CE Primary School

Science Long Term Plan



Aims:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of **biology**, **chemistry** and **physics**.
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Early Years Framework and National Curriculum

Early Years Framework and National Curriculum	
Nursery	<p>Communication and Language</p> <ul style="list-style-type: none"> • Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" <p>Personal, Social and Emotional Development</p> <ul style="list-style-type: none"> • Make healthy choices about food, drink, activity and toothbrushing. <p>Understanding the World</p> <ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.
Reception	<p>Communication and Language</p> <ul style="list-style-type: none"> • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.

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	<ul style="list-style-type: none"> Use new vocabulary in different contexts. <p>Personal, Social and Emotional Development</p> <ul style="list-style-type: none"> Know and talk about the different factors that support their overall health and wellbeing: <ul style="list-style-type: none"> regular physical activity healthy eating toothbrushing sensible amounts of 'screen time' having a good sleep routine being a safe pedestrian <p>Understanding the World</p> <ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel while they are outside. Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them. 					
ELG – Communication and Language	<p>Listening and Attention</p> <ul style="list-style-type: none"> Make comments about what they have heard and ask questions to clarify their understanding. 					
ELG – Personal, Social and Emotional Development	<p>Managing Self</p> <ul style="list-style-type: none"> Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. 					
ELG – Understanding the World	<p>The Natural World</p> <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 					
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS Nursery	Talk about what they can see, using a wide vocabulary. Begins to make sense of their own life-story and family's history.	Use all their senses in hands-on exploration of natural materials. Explore collections of materials with	Begin to understand the need to respect and care for the natural environment and all living things.	Make healthy choices about food, drink, activity and toothbrushing.	Explore how things work. Explore and talk about different forces they can feel.	Understand 'why' questions. "Why do you think the caterpillar got so fat?"

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		<p>similar and/or different properties.</p> <p>Talk about the differences between materials and changes they notice.</p>		<p>Plant seeds and care for growing plants.</p> <p>Understand the key features of the life cycle of a plant and animal.</p>		
<p>EYFS Reception</p>	<p>Learn and use new vocabulary during the day.</p> <p>Ask questions to find out more and to check they understand what has been said to them.</p> <p>Describe what they see, hear and feel whilst outside.</p> <p>Seasons - Understand the effect of changing seasons on the natural world around them.</p>	<p>Use new vocabulary in different contexts</p> <p>Know and talk about the different factors that support their overall health and well-being: regular physical activity, healthy eating, toothbrushing sensible amounts of 'screen time,' having a good sleep routine, being a safe pedestrian.</p> <p>Describe what they see, hear and feel whilst outside.</p> <p>Seasons - Understand the effect of changing seasons on the natural world around them.</p>	<p>Articulate their ideas and thoughts in well-formed sentences.</p> <p>Describe what they see, hear and feel whilst outside.</p> <p>Seasons - Understand the effect of changing seasons on the natural world around them.</p>	<p>Explore the natural world around them</p> <p>Describe what they see, hear and feel whilst outside.</p> <p>Seasons - Understand the effect of changing seasons on the natural world around them.</p>	<p>Describe what they see, hear and feel whilst outside.</p> <p>Recognise some environments are different to the one in which they live.</p> <p>Seasons - Understand the effect of changing seasons on the natural world around them.</p>	<p>Describe some events in detail.</p> <p>Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.</p> <p>Describe what they see, hear and feel whilst outside.</p> <p>Seasons - Understand the effect of changing seasons on the natural world around them.</p>

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EYFS – scientific enquiry opportunities	Encourage scientific enquiry	Encourage scientific enquiry	Encourage scientific enquiry	Encourage scientific enquiry	Encourage scientific enquiry	Encourage scientific enquiry
	<ul style="list-style-type: none"> • Classification- Sort images of people according to their characteristics. • Researching using secondary sources- Find out information from visitors (dentist, nurse etc.). • Pattern seeking - Are taller children faster? Are taller children stronger? 	<ul style="list-style-type: none"> • Comparative testing - Compare the shape of shadows made by different objects. • Classification - Which objects/ materials make dark shadows? • Observing over time - How do the Sun and shade change during the day? How does a toy's shadow change during the day? • Researching using secondary sources - find out about shadows. Find out about rainbows. Find out about nocturnal animals. 	<ul style="list-style-type: none"> • Classification - Name and describe plants and animals they find in the school grounds. • Pattern seeking - Look for minibeasts in different areas of the school grounds. Look for plants in different areas of the school grounds. 	<ul style="list-style-type: none"> • Classification - Sort animals according to where they live. • Researching using secondary sources - Learn how animals from a different habitat are cared for. Learn about animals in a different habitat. 	<ul style="list-style-type: none"> • Pattern seeking - Find simple patterns in how light levels and temperature change with the movement, or obscuring of, the Sun. • Research using secondary sources -Find out about the Solar System, stars and space travel. • Comparative testing - How many cubes/small plastic animals can fit in different 'boats'? 	<ul style="list-style-type: none"> • Comparative testing – Make and testing air-propelled rockets to find out which is the 'best'. • Compare how cars move down ramps/gutters. Compare how wheels turn when sand or water is poured through. Compare how objects fall. Compare how objects fall with and without parachutes. Compare how different balls bounce. Compare how things move when blown. Compare how a marble moves through different

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						liquids. Compare how different paper aeroplanes fly.
EYFS Understanding the World – topic themed opportunities	Home Sweet Home Humans <ul style="list-style-type: none"> Talk about members of their immediate family and community. Name and describe people who are familiar to them. 	Light and Dark Light <ul style="list-style-type: none"> Describe what they see, hear and feel whilst outside. 	Go Wild Habitats <ul style="list-style-type: none"> Draw information from a simple map. Explore the natural world around them. Describe what they see, hear and feel whilst outside. Recognise some environments that are different to the one in which they live. 	On the Farm Animals, excluding humans <ul style="list-style-type: none"> Recognise some environments that are different to the one in which they live. 	Traditional Tales Earth and Space <ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside. 	When I grow up Forces <ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside.
	<p style="text-align: center;">Working scientifically</p> <p>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:</p> <ul style="list-style-type: none"> Asking simple questions and recognising that they can be answered in different ways (Q) Observing closely, using simple equipment (OC) Performing simple tests (ST) Identifying and classifying (IC) Using their observations and ideas to suggest answers to questions (A) Gathering and recording data to help in answering questions (D) 					

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<p>Year 1</p>	<p>Seasonal Changes</p> <ul style="list-style-type: none"> Observe changes across the 4 seasons. Observe and describe weather associated with the seasons and how day length varies. 	<p>Animals including Humans</p> <ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body. Say which part of the body is associated with each sense. 	<p>Everyday materials</p> <ul style="list-style-type: none"> Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. 	<p>Plants</p> <ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees. 	<p>Animals</p> <ul style="list-style-type: none"> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets).
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<p>Vocabulary</p>	<p>Season, Spring, Summer, Autumn, Winter, weather, hot/warm, cool/cold, sun/sunny, cloud/cloudy, wind/windy, rain/rainy, hail/hailing, sleet, frost, ice/icy, rainbow, thunder, lightning, storm, light/dark, day/night.</p>	<p>Name body parts (hair, face, leg etc). Parts of the body including those linked to PSHE teaching. Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue</p>	<p>Objects, material, wood, plastic, glass, metal, water, rock, brick, paper, fabrics, card/cardboard, elastic, foil, rubber, wool, clay, hard, soft, stretchy, bendy, stiff, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through.</p>	<p>Leaf/leaves, flower, blossom, petal, fruit, berry, root, bulb, seed, trunk, branch, stem, bark, stalk, vegetable.</p>	<p>Wild, pets, head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves. Names of animals experienced first-hand from each vertebrate group.</p>
<p>Activities</p>	<p>Seasonal changes Adopt a tree – detailed observations of how it changes over the months (see Mark Hirsch). Create seasonal trays. Links to art – colour mixing, printing, weaving, rubbing, collage and photography. Measures – rainfall, wind speed, temperature recorded using charts, tables and graphs (maths link). Present as weather report (SL link). Autumn – Welly walks and scavenger hunts (OC, IC). Leaf colour change investigation (OC, ST). Weather forecasting with pine cones (Q, OC, A, D).</p>	<p>Humans Large scale labelling. Sing it, rhyme it, play it. Body part collage (IC, A,D). Investigating the five senses (Q, OC, ST, IC, A, D).</p>	<p>Everyday Materials Santa's sorting (OC, IC). Guessing game (Q, IC). Materials hunting (IC, A). Collecting materials (OC, IC). Feely boards, walls, books, handprints or collages (OC, IC, D). Waterproof/not waterproof -See through/not see through-stretchy/not stretchy (Q, OC, ST, IC, A, D).</p>	<p>Plants I spy trail (OC, IC, D). Flower power (Q, OC, IC, A, D). Articulate through art (OC, IC, D). Identifying fruits and vegetables (OC, IC, D). Parts of plants (OC, IC). Forest of trees models (IC, D). Which part can we eat? (Q, IC, A).</p>	<p>Animals (NB: ensure children know humans are animals). Visits out or in. Bring your toy animal to school sorting activities (Q, OC, IC, A, D). Animals in books – Rumble in the Jungle, Commotion in the Ocean, Cock-a Doodle-Do, Creaturepedia, Just Imagine (IC, A). How big? How small? (Q, D/ , research). What's for dinner? Open wide! Who is coming to tea? (IC, A, D). Sort it out! (Q, IC, A, D). Whose body part? (IC, D). Animal x-rays (Q, IC, research).</p>

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	<p>Winter – Evergreen and deciduous investigation (OC, ST, IC, A, D). How windy is it? (OC, IC, A, D). Predicting and measuring temperature (OC, D). Investigating snow (Q, OC, A).</p> <p>Spring – Journey stick/bracelet/picture frame (OC, IC, D). Measuring rainfall (OC, D). Changing clocks (A, D).</p> <p>Summer – scavenger hunt (OC, IC). Sunshine and temperature UV beads (Q, OC, A). Predicting and measuring temperature (OC, D).</p>				
<p>Year 2</p>	<p>Animals including Humans</p> <ul style="list-style-type: none"> • Notice that humans, have offspring which grow into adults. • Find out about and describe the basic needs of humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. • To understand that animals, including humans, have offspring (babies) which grow into adults. 	<p>Living things and their habitats</p> <ul style="list-style-type: none"> • Explore and compare the differences between things that are living, dead, and things that have never been alive. • 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. • Identify and name a variety of plants and animals in their habitats, including microhabitats. 	<p>Plants</p> <ul style="list-style-type: none"> • 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>Uses of everyday materials</p> <ul style="list-style-type: none"> • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and 	

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	<ul style="list-style-type: none"> To compare the stages of the human life cycle. To recognise the importance of a balanced diet. To investigate the effects exercise has on the human body. To understand the importance of good hygiene. 	<ul style="list-style-type: none"> Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. 		<p>cardboard for particular uses.</p> <ul style="list-style-type: none"> Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
Vocabulary	Offspring, babies, young, grow, change, adults, older/younger, basic needs, water, food, air, breathing, survival, exercise, food types, fruit and vegetables, bread, rice, potato, pasta, milk and dairy foods, foods high in fat or sugar, meat, fish, eggs, beans, hygiene, clean, wash, healthy, medicine, drugs.	Living, dead, never been alive, move, grow, feed, have offspring/young/babies, name locations e.g. pond/woodland/meadow, name microhabitats e.g. under log/on a stony path/under bushes, damp/wet/dry, dark/light, hot/warm/cool/cold, use comparatives e.g. hotter, suited/suitable, basic needs, depend, food, food chain, shelter.	Seeds, bulbs, fully grown, water, light, damp/wet/dry, dark/light, hot/warm/cool/cold, use comparatives e.g. hotter, grow/growth, healthy, shoot, seedling, wither/limp, die, dry/crispy, soil, earth.	Suitable/unsuitable, use/useful, object, material, property, wood, plastic, metal, glass, water, rock, paper, fabric, brick, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, rigid, flexible, waterproof, absorbent, strong/weak, rough, smooth, reflective, non-reflective, transparent, opaque, translucent, shape, changed, push/pushing,

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				pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching, pinch/pinching, poke/poking, roll/rolling, squeeze/squeezing.
Activities	<p>Animals including humans</p> <p>Visit to farm or hatching kit (butterfly/stick insect/silkworms). Invite mother and newborn baby in (Q, OC, IC).</p> <p>Recording and presenting life cycles (D, research).</p> <p>Quizzical questions and awesome answers (Q, A, research).</p> <p>Healthy me diary (D).</p> <p>Superhero training school (D)</p> <p>My healthy plate: sorting food.</p> <p>Healthy and unhealthy.</p> <p>Food groups.</p> <p>How much?</p> <p>You are what you eat. (IC, D).</p> <p>Learning about hygiene: germs.</p> <p>How does soap help to get rid of germs?</p> <p>What happens when you eat without washing your hands? (Q, OC, ST, IC, A, D).</p> <p>Brush your teeth! (Q, OC, ST, A, D).</p>	<p>Living things and their habitats</p> <p>Compare large doll/puppet with a real child to get children thinking about the basic characteristics of living things. Compare an animal with a plant (IC, A).</p> <p>Sorting and grouping living and non-living.</p> <p>Hunting and searching (IC, A, D).</p> <p>Out and about Nature detectives website.</p> <p>Terrific trees.</p> <p>Articulate through art (Georgia O'Keeffe) (OC, IC, D, research).</p> <p>Bug hotel observation (real life observation in their natural habitat).</p> <p>Post box problem (IC, A).</p> <p>Make a habitat in a box (IC, D, research).</p> <p>Find it and eat it! Food chains. (IC, A).</p> <p>Food chain paper chain (IC, D).</p>	<p>Plants</p> <p>Observing plants from bulbs (OC, D).</p> <p>Observing plants from seeds-grow a grass hair family (OC, D) use to set up test no light, no water, no warmth. (Q, OC, ST, A, D).</p>	<p>Uses of everyday materials</p> <p>Materials munchers – sort materials to 'feed' the right muncher (IC, A).</p> <p>Materials hunt – wood, plastic, glass, metal, rock, paper, cardboard, brick, fabric, elastic, rubber and ceramic-consider suitability (OC, IC, A).</p> <p>Ridiculous materials e.g. a chair made out of chocolate.</p> <p>Riddles and rhymes – descriptive verse to explain material. (IC, A).</p> <p>3 Little Pig houses.</p>

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					Absorbant/not absorbant. Testing shock absorbancy – Who Pushed Humpty Dumpty by David Levinthal. (A, OC, ST, IC, D). Make it – soft dough shapes (A, D). Test it – change shape of different objects (OC, ST, IC, A, D).
Working scientifically					
<p>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:</p> <ul style="list-style-type: none"> • Asking relevant questions and using different types of scientific enquiries to answer them (Q) • Setting up simple practical enquiries, comparative and fair tests (ECF) • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (OM) • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions (A) • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (R) • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (RC) • Using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions (+Q) • Identifying differences, similarities or changes related to simple scientific ideas and processes (DSC) • Using straightforward scientific evidence to answer questions or to support their findings (E) 					
Year 3	Animals, including humans <ul style="list-style-type: none"> • Identify that animals, including 	Rocks and soils <ul style="list-style-type: none"> • Compare and group together different kinds of 	Forces and Magnets <ul style="list-style-type: none"> • Compare how things move on different surfaces. 	Plants <ul style="list-style-type: none"> • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. 	Light <ul style="list-style-type: none"> • Recognise that they need light in order to see

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	<p>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> <ul style="list-style-type: none"> Identify that humans and some other animals have skeletons and muscles for support, protection, and movement. 	<p>rocks on the basis of their appearance and simple physical properties.</p> <ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having 2 poles. Predict whether 2 magnets will attract or repel each other, depending on which poles are facing. 	<ul style="list-style-type: none"> Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<p>things and that dark is the absence of light.</p> <ul style="list-style-type: none"> Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change.
Vocabulary	Nutrition, nutrient, food types, fruit and vegetables, bread, rice, potato, pasta, milk and dairy foods, meat, fish, egg, beans, food high in fat or sugar, carbohydrates,	Rock, stone, pebble, boulder, soil, fossils, grains, crystals, hard/soft, texture, absorb water, let water through, marble, chalk, granite, sandstone, slate,	Force, pushing/pulling, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet,	Leaf/leaves, flower, blossom, petal, fruit, berry, root, bulb, seed, trunk, branch, stem, bark, stalk, water, light, air, nutrients, soil, damp/wet/dry, dark/light, hot/warm/cool/cold, fertiliser, use comparatives e.g. hotter, grow/growth, healthy, transported, life	Light, light source, names of light sources, torch, dark/darkness, reflect, reflective, mirror, shadow, block, direct/direction,

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	protein, vitamins and minerals, fat, dietary fibre, water, balanced diet, skeleton, protection, movement, skull, ribs, spine, vertebra, joints, sockets, bones, tendons.	sandy soil, clay soil, chalky soil, peat, sedimentary, metamorphic, igneous.	attract, repel, magnetic material, metal, iron, steel, non-magnetic material, poles, north pole, south pole.	cycle, pollination, seed formation, seed dispersal.	transparent, opaque, translucent.
Activities	<p>Animals including humans Reading and comparing nutrition labels. Nutrition calculators (A, R). How much fat? (ECF, OM, A). How much sugar? (A, R). Five a day (A, research). Creative x-rays (E, RC). Bones for protection. Bones for support (A, E). Muscles for movement (A, E).</p>	<p>Rocks and soils Observe un-named rock samples and describe properties Group, sort and classify. Key to follow to name rock samples (OM, A, R). Geologists pick rocks via properties following scenarios e.g. kitchen work top, skate ramp, roof, statue (ECF, OM, A, R, RC, +Q). I-Spy rocks -pictoral 'I spy' sheet outdoor search where why and what uses (OM, A, R). Make a mould, cast and amber fossil (RC, E). Weathering and erosion through cartoon strip /narrative/rap/animation/ drama/dance.</p>	<p>Forces and magnets Toy manufacturer contacting children for help scenario: Toyologist challenge 1 - letter to improve 'loop racer' track (ECF, OM, RC, +Q). Toyologist challenge 2 – guiding car along the track using a magnet (ECF, OM, A, R, RC, +Q). Toyologist challenge 3 – moving the car without contact ECF, OM, R, RC, +Q). The floating paper clip (ECF, OM, +Q). Toyologist challenge 4 – information leaflet for toy shop to promote 'magna car' all about magnets (Q, R, RC). Toyologist challenge 5 – bar magnets fixed to car last modification – poles investigation (ECF, OM, E).</p>	<p>Plants Observe from seeds no air, light, water, nutrients from soil or room to grow (Q, A, ECF, OM, R, RC, +Q, DSC, E). Dissect flowering plant (Q). Remove part of the plant to observe what happens e.g. roots/leaves (ECF, OM, A, R, RC, +Q, DSC). Blowing in the wind – observe how roots anchor plants (ECF, RC). How do plants get water white carnations & plastic bag around branch of tree (ECF, OM, RC, +Q, DSC, E). Dissect flower and role play (A).</p>	<p>Light Experience complete darkness (DSC, E). Sorting light sources. Empty show box with pin hole to test light sources (ECF, A, R). Data logger/app to measure reflection from materials (link to light house of Alexandria) (Q, ECF, OM, E). UV beads and effectiveness of suncream and sunglasses. Data loggers test sunglasses. (Q, ECF, OM, RC, E). Explore shadows open questions. Shadow sculpture – which material</p>

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		Separating soils – observe under microscope. Soil and water jar to observe. Lego block soil model (ECF, OM, R).			makes the best shadow? (Q, E, +Q). The great shadow size investigation – distance from light source and size of shadow (ECF, OM, R, RC, +Q).
Year 4	Animals, including humans <ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey. 	States of matter <ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 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). Identify the part played by evaporation and condensation in the water cycle and associate the rate of 	Sound <ul style="list-style-type: none"> 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 	Living things and their habitats <ul style="list-style-type: none"> Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things. 	Electricity <ul style="list-style-type: none"> Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. 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

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		evaporation with temperature.	the sound source increases.		<p>loop with a battery.</p> <ul style="list-style-type: none"> Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.
Vocabulary	Digestive system, nutrition, nutrient, mouth, teeth, canines, incisors, molar, pre-molar, saliva, tongue, rip, tear, chew, grind, cut, oesophagus, stomach, small intestine, large intestine, rectum, anus, carnivore, herbivore, omnivore, producer, consumer, predator, prey, food chain.	Sound, sound source, noise, vibrate/vibration, travel, solid/liquid/gas, pitch, tune, high/low, volume, quiet/loud, fainter, muffle, strength of vibrations, insulation, instrument, percussion, strings, brass, woodwind, tuned instrument.	States of matter, solid, liquid, gas, powder, grain/granular, crystals, change state, ice/water/steam, water vapour, heated/heating, cooled/cooling, temperature, degrees/Celsius, melt, freeze, solidify, melting point, molten, boil, boiling point, evaporate (tion), condense(tion), water cycle,	Classification keys, environment, fish, amphibians, reptiles, birds, mammals, vertebrates, invertebrates, names some invertebrates, human impact.	Electricity, appliance/device, mains, plug, electrical circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, connect/connection, loose connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer,

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			precipitation, transpiration.		motor, fast(er)/slow(er), conductor, insulator, metal/non-metal.
Activities	Animals including humans The digestive system model (A, R, E). Digestive system measuring (OM, R). Open wide playdoh teeth model (OM, R). Take a bite which teeth? (R, DSC). Find it eat it! team food chain game. Presenting food chains cups producers, predators and prey (Q, A, R). Exploring owl pellets The Barn Owl Trust (ECF, O).	States of Matter Ballooning around – ice, water and air-filled balloons (OM, DSC). Shopping bag sort (A, R). Explore and discuss everyday examples of materials changing. Investigate it – heating and cooling chocolate e.g. crispy cakes cooled in different places (Q, ECF, RC, E). Melting and freezing points – foil cases with different materials in different temperatures of water (ECF, OM, RC, DSC). Research it – game Play your melting points right – higher or lower cards (Q, A, research). Water cycle raps or songs to learn, descriptive writing	Sound Set up hidden sound meter linked to screen-question children about what the changing numbers mean (OM, DSC). Vibration stations 1 – touching throat, tuning forks, drums with rice to discover the effects of vibration (Q, OM, R). Reverse thinking – does sound work if there is no air (Clips). Vibration stations 2 – scratch under table, glass to wall, 'ear to the ground' explain, string telephone, make a hydrophone – write an explanation for other children (R, E). Open ended exploration about pitch – music trolley, ruler twang, plucking rubber bands, bottle blow, boom whakers (OM, R, +Q).	Living things and their habitats Human classification – similar or different. Guess Who game using observable characteristics (Q, OM). Animal classification – lego block animal sort and classify – continue to add to throughout the topic (A, research). Whole class key outside yes/no questions chalk on the ground. A carousel of key activities for children to follow e.g. Marvel characters, Barbies, football players... Out and about – use keys to identify shells/plants/trees... (R, research). The Lorax by Dr. Seuss – repercussions of cutting down the Truffula tree on a food chain. Research it – expert groups use secondary sources to research how environmental changes are affecting endangered species e.g. bee, water vole, Great Crested Newt, orangutan, panda, tiger or hammerhead shark. Link to persuasive writing (RC, E, research).	Electricity Mime it – mime using an electrical appliance for the rest of the class to guess. Cut it out – magazines pics of electrical appliances then use for sorting and grouping activities. Sweet circuits – all sorts/laces/jelly worms to find a look alike and then make a circuit (R, DSC). Electrical qualification: 1). Identifying and naming parts match part to label (A). 2). Building simple circuits list to make and tick off a checklist (R) Human circuit. 3). Inspecting circuits – find the fault (R).

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		<p>related to a drop of rain's journey. Modelling the water cycle – hot water, bowl, clingfilm, ice or window water cycle in sealable bag (A, R, DSC). Creative post topic assessment – word art to reflect key vocabulary drawn in the style of the word (A, DSC).</p>	<p>Giant remote control pointed at class storm in a circle – body percussion (DSC, E). Make a clap-o-meter – performance poetry The Sound Collector by Roger McGough using clap-o-metre to rate performance using sound app/data logger (ECF, OM, +Q). Sound distance – data logger as children move away from sound e.g. alarm, ring tone...(Q, ECF, OM, R, +Q).</p>		<p>4). Connect a switch – explore different types of switch. Design and make a switch (A, R). Products for human circuits inc. circuit sticks, cosmic balls or circuit maker breakers (ECF, OM, +Q). 5). Conductors and insulators – test a range of materials using a circuit they have built (ECF, OM, +Q).</p>
	Working scientifically				
	<p>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:</p> <ul style="list-style-type: none"> • Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (A) • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (M) • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (D) • Using test results to make predictions to set up further comparative and fair tests (CFT) • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations(RPF) • Identifying scientific evidence that has been used to support or refute ideas or arguments (SE) 				
Year 5	Forces	Earth and space	Animals, including humans	Properties and changes of materials	Living things and their habitats

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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Describe the lifecycle of a human. Explain how babies grow and develop. Describe the main changes that take place during puberty investigate the gestation period of different mammals. 	<ul style="list-style-type: none"> 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. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. 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. 	<ul style="list-style-type: none"> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.
Vocabulary	Fall, gravity, air resistance, water resistance, friction, moving surfaces, mechanisms, levers, pulleys, gears, force, transfers.	Earth, planets, Sun, solar system, Moon, celestial body, sphere/spherical, rotate, rotation, spin, night and day, Mercury, Venus, Mars,	Womb, foetus, embryo, gestation, baby, toddler, teenager, elderly, growth, development, puberty.	Solubility, electrical conductivity, thermal conductivity, melting, dissolve, solution, soluble, insoluble, solute, solvent, particle, mix/mixture, filtering, sieving, evaporating, condensing, reversible changes, new material, not usually reversible, irreversible, burning,	Life cycle, reproduction, sexual, asexual, mammal, amphibian, insect, bird, fish, reptile, eggs, live young.

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		Jupiter, Saturn, Uranus, Neptune, Pluto, dwarf planet, orbit, revolve, geocentric model, heliocentric model, shadow clocks, sundials, astronomical clocks.		gas given off, rusting, hard/soft, stretchy/rigid, flexible, waterproof, absorbent, strong/weak, rough, smooth, reflective, non-reflective, transparent, opaque, translucent.	
Activities	<p>Forces Gravity carousel: 1). Splodge of paint on vertical paper. 2). Bottle tip. 3). Hang upside down/cartwheel/hand stand. 4). Hang jump. 5). Hang ball throw (RPF, SE). Friction – best material for goalie gloves using force meter. Friction – zip wire investigation (A, M, D, RPF). Air resistance – run with/without a large sheet or open umbrella. Parachute/paper spinners/cake cases drop, blowing straw rockets or jumping on stomp rockets fair tests. Balloon rockets/toy cards with</p>	<p>Earth and space Variety of objects for children to choose from to represent the Sun, Moon and Earth e.g. balls, pom poms, dice, hoops, counters, playdough...Consider shape, relative size, research images/facts for debate (D, SE, research). Balls and torches for children to model day and night providing key vocabulary. Match rotation of the Earth to key times (D, RPF, SE). Outside children to represent their model. Party on the planets – label children to represent the planets (D, RPF, SE, research). It could be you – discovery of planet x 2016 create a</p>	<p>Animals including humans Teen/older visitor, timelapse videos, aging app with commentary added. Compare photographs of different stages (RPF, SE).</p>	<p>Properties and changes of materials Place a wide range of objects and materials for children to assist in making a word bank for properties. Extend by asking groups to choose one property to investigate then group materials together using their results e.g. response to magnets through liquids/stopping a magnetic force. Thermal conductivity keeping items hot or cold. Absorbency of rabbit bedding, nappies or paper towels. Sugar cube absorbency. Stretch-ability length of elastic for an action doll to bungee jump. Costume for elastigirl (A, M, D, CFT, RPF). Groups should go on to explain why particular materials are fit for purpose. Which materials in my kitchen cupboard dissolve? – observe different solids found in the kitchen when added to water. Group into soluble and insoluble and suggest others to test. Encourage children to ask their own solubility questions. Teacher demonstration dissolve polystyrene cup with nail varnish remover. (A, M, D, CFT, RPF).</p>	<p>Living things and their habitats Stick labels on children's backs with a name of an animal to include mammals, amphibians, insects, and birds. Yes/no questions to identify the animal. Children then form groups according to statements e.g. carnivore/omnivore/herbivore; predator/not a predator; mammal/amphibian/insect/bird...- children produce a definition of what it means to be in the group insect/bird/amphibian/mammal (D).</p>

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	<p>card attached (A, M, D, CFT, RPF). Water resistance – different shapes of playdough dropped water (M, D, CFT, RPF, SE). Investigating pulleys – lift sand filled milk bottle then rope over tree branch (RPF, SE0). Investigating levers – position fulcrum differently under ruler to lift a load measured in Newtons (A, M, D, RPF).</p>	<p>newspaper article to include other interesting planetary discoveries (SE, research). Foil wrapped ball and torch to indicate phases of the Moon. Moon diaries to complete for 28 days (D, RPF). Modelling the phases of the Moon – lamp, ball on a stick (Moon), child for the Earth (RPF, SE). Moon surface fair tests using sand trays – how does the size of meteorite affects the size of the crater? How does the height affect the depth of the crater? How does the shape of the meteorite affect the length of the ejecta? (A, M, D, RPF, SE). Fiction vs fact – children find misconceptions in books and work as editors before drafting scientifically correct explanations. Books e.g. The Loon on the Moon, Goodnight</p>		<p>Finding a solution solution! – recovering solids that have dissolved (RPF). Challenge activities – open ended e.g. separating ingredients from a witch's brew, recipe, contaminated water sample or mixed materials found at a crime scene (A, RPF). Lemonade – separating solids and liquids – make recipe observing which ingredients dissolve (RPF). Lemonade company asked for fruity ice cubes to add to the drink – how long to freeze and melt? Company updating their handbook and would like to know which processes from making the lemonade and the ice cubes can be reversed (A, M, D, CFT, RPF). Creating new materials 1 – teacher demonstration ancient tradition of burning money during the Chinese New Year observe turns to ash and not reversible (RPF, SE). Creating new materials 2 – inflate balloon on top of a bottle using bicarbonate of soda and vinegar to produce carbon dioxide gas (irreversible). Extend to own questions for the children to investigate e.g. Does the amount of vinegar affect the balloon size? Do other liquids work? Can a paper bag be used? Does changing the amount of bicarbonate affect how quickly the balloon/glove inflates? (CFT, RPF, SE). Can we make fizzy lemonade? Children investigate what they could add to</p>	<p>Observe a lifecycle (e.g. stick insects) and record over time (D). From labels above, children research lifecycle and present to class (D, RPF, research). Plant reproduction – asexual reproduction in plants. Collect seeds from vegetables and try to grow. Carrot tops/lettuce stubs/spring onions ends in saucers. Children given opportunity to investigate what other plants they could re-grow. Growing cuttings non-flowering shoots of plants (A, M, D, CFT, RPF). Production in animals – research and compare how different animals reproduce by answering questions such as:</p>
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		Magic Moon and Whatever Next (SE, research).		make the lemonade fizzy e.g. yeast, icing sugar, castor sugar, self-raising flour or bicarbonate of soda (A, CFT).	Do all animals give birth to live animals or lay eggs? Why do some animals lay more eggs than they need? Can male animals give birth? How do seahorses, sharks, stick insects or freshwater turtles produce babies? Are all animals pregnant for the same amount of time? (RPF, research).
Year 6	<p>Electricity</p> <ul style="list-style-type: none"> 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. 	<p>Animals, including humans</p> <ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are 	<p>Living things and their habitats</p> <ul style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics. 	<p>Light</p> <ul style="list-style-type: none"> Recognise that light appears to travel in straight lines. 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. 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. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. 	<p>Evolution and inheritance</p> <ul style="list-style-type: none"> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but

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	<ul style="list-style-type: none"> Use recognised symbols when representing a simple circuit in a diagram. 	transported within animals, including humans.			<p>normally offspring vary and are not identical to their parents.</p> <ul style="list-style-type: none"> Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Vocabulary	Volume, motor, fast(er)/slow(er), conductor, insulator, metal/non-metal, voltage, current, amps, resistance.	Circulatory system, heart, blood, blood vessels, pumps, oxygen, carbon dioxide, lungs, nutrients, water, diet, exercise, drugs, lifestyle.	Organism, micro-organism, fungus, mushroom.	Light, light source, names of light sources, dark/darkness, reflect, reflective, mirror, shadow, block, absorb, refraction, spectrum, rainbow.	Evolution, suited/suitable, environment, adapted, adaptation, offspring, characteristics, vary/variation, inherit/inheritance, fossils.
Activities	<p>Electricity</p> <p>Ask children to draw on whiteboards what they think the symbols for basic components are e.g. cell, wire, bulb, buzzer, motor and switch.</p>	<p>Animals including humans</p> <p>Make a pumping heart model-jar, balloon, straw (RPF, D).</p> <p>Blood vessels - articulate through art (D).</p>	<p>Living things and their habitat</p> <p>Recap living and non-living moving on to subgroups of living things – lollipop sticks branching out -plants and animals how would they further subdivide</p>	<p>Light</p> <p>Investigate whether light can be bent or curved. Three pieces of thick card with hole punched in the centre, upright in a row and observe how light travels through. What if the cards were not in a line? (CFT, SE).</p>	<p>Evolution and inheritance</p> <p>A fossil analogy – white bread with jelly shrimp, worm, or bear on it (dead organism). Add different layers of different</p>

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	<p>Match component names, description, and circuit symbols (D). Learning about Alessandro Volta – examine different sizes and shapes of cells and batteries and look at the voltage (research). Keeping it real – Children use their own circuits to investigate what happens when 2+ cells used, as well as different voltage cells and batteries, to power a buzzer or bulb using scenario of shop owner needing to make a brighter sign to attract customers (A, CFT, RPF). Extend shop owner problem who has a problem of only one 1.5V cell – how else could they brighten the sign? Pet shop next door wants to decrease the brightness of their lights and volume of their door buzzer (A, CFT, RPF).</p>	<p>Circulatory system - drama role play- tour guide excursion (RPF) Calculate measurements linked to circulatory system (R) (M) Journal to record, interpret and evaluate lifestyle choices (M, D, RPF). Investigate the effects of exercise on pulse rate (A, M, D, RPF). A responsible task – set up breaktime healthy tuck shop researching nutritional information. Make snacks to sell such as: fruit kebabs, smoothies, granola bars and frozen yoghurt (RPF, research). Impact of smoking model – sealed lidded jar, sponge, newspaper (RPT, SE). More about blood – make a model of a sample of blood while observing magnified images. (D, RPF).</p>	<p>them? Learn about the biologist Carl Linnaeus (D). Classifying micro-organisms - how to prevent mould on bread (A, M, D, CFT, RPF). Articulate through art – examine images of micro-organisms as they would appear under microscope. Recreate images through art. Use secondary sources to research useful and harmful micro-organisms. Add to lollipop branch (D, research). I'll remember that! -look carefully at common observable characteristics of a common plant e.g. daffodil description- consider the problem of naming plants and animals in such a long, detailed way (research, SE). Carl Linnaeus and a much easier system of naming – research and write about the life of CL, Children to create names for new plant</p>	<p>Show box with pin hole. Children should explain why they can only see complete darkness (SE). Light maze – flip chart paper on tables, fixed torch and eye target facing away from the torch – how can they shine the torch light on to the eye target without moving the eye or torch? Draw the path, once successful, on the flip chart paper (A, D, RPF). Cuddly toy children draw a quick diagram to show how we see it. Use string to show the path of the light. Extend by considering how a person with their back to the toy could see it (D, SE). Children investigate if they can change the shape of an objects shadow without altering the object itself. Use their knowledge of how light travels to explain why it can not be changed (A, CFT, RPF, SE).</p>	<p>bread (sediment), add books to weigh down (pressure). Leave for 5 days then use a straw to drill down through the layers of 'rock'. Examine the imprint left by the sweet (RPF, SE). Fossil detectives – fossil samples for children to identify and consider what we can learn from them. Research recent fossil findings – written biological text or newspaper report (RPF, SE, research). Offspring – research and discuss the family tree of The Simpsons/The Flintstones/The Addams Family. Photographs from home or celebrities to discuss inherited characteristics (RPF, SE). Investigating animal</p>
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	<p>Putting it into practice – open ended challenge – make a burgler alarm for a valuable item/a sensor to indicate when a bath contains the required amount of water/a light up greeting card/an electrical buzz wire game (A, RPF).</p>		<p>species both common name and binomial Latin name (RPF, SE).</p>		<p>adaptations 1 - Darwin's beak adaptation of finches on the Galapagos Islands – children use a range of utensils to represent the beaks and investigate different food they can pick up in an agreed amount to time (D, RPF, SE). Investigating animal adaptations 2 – 1845 peppered moths Manchester adapted colour to camouflage on trees to match pollution changes. Scatter different coloured wool on coloured background to pick up with tweezers. Adaption leads to evolution (D, CFT, RPF, SE). Investigating plant adaptations – Focus on how plants survive in a rainforest.</p>
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					<p>Investigate different shaped leaves and how they dry quickly or not. Design a 'super leaf' that has the best chance of surviving in a rainforest.</p> <p>Research different leaves. Waxy leaf investigation using greaseproof paper (A, M, D, CFT, RPF).</p>
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