



ST DAVID'S CE PRIMARY SCHOOL

SCIENCE CURRICULUM MAP & PROGRESSION

Term	EYFS	KS1		LKS 2		UKS 2	
		Year A	Year B	Year A	Year B	Year A	Year B
Autumn 1	All about me Parts of the body senses Seasonal changes Growth & Change- humans	Biology Plants (1)	Biology Animals including humans (1)	Chemistry Rocks	Biology Animals including humans (3)	Physics Forces	Biology Animals including humans (5)
Autumn 2		Physics Seasonal Changes		Biology Living things & their habitats		Physics Electricity	Biology Animals including humans (6)
Spring 1		Toys and materials Identifying materials Seasonal Changes	Chemistry Everyday Materials	Biology Living Things & their Habitats	Physics Forces & Magnets	Physics Sound	Physics Earth & Space
Spring 2	Chemistry Uses of everyday materials (2) Physics Seasonal Changes		Physics Electricity			Physics Light	
Summer 1	On The Farm Plants and growing Seasonal changes	Biology Plants (2)	Biology Animals including humans (2)	Biology Plants	Chemistry States of matter	Biology Living things & their habitats (5)	
Summer 2		Physics Seasonal Changes		Physics Light	Biology Animals including humans (4)	Biology Living Things & their habitats (6)	Biology Evolution & Inheritance



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Working scientifically strands	Phases of investigations/enquiries
Observation over time	<i>Plan</i>
Identify, Classify & Group	<i>Do</i>
Pattern Seeking	<i>Record</i>
Comparative & Fair Test	<i>Review</i>
Research	



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BIOLOGY		PROGRESSION - PLANTS	
Reception 	Declarative Knowledge <ul style="list-style-type: none"> Plants are living things Plants grow and change over time Plants all have a life cycle Plants need to be looked after to survive Plants need water, sunlight and space to grow Plants can grow from bulbs or seeds Different plants grow at different times of the time of the year (snowdrops and daffodils) Different conditions can affect how plants grow 		
	Vocabulary: plant, change, grow, lifecycle, seed, leaf, root, stem, petal, check, describe, explain, predict, environment, natural, responsibility, take care, empathy		
Year 1 	Declarative Knowledge Y1 <ul style="list-style-type: none"> Name the parts of a plant: roots, stem, flower, petals, leaves, blossom, seeds, fruit The names of some common wild and garden plants: Wild plants - dandelion, daisy, buttercup, nettles, clover, Garden plants: daffodil, sweet pea, sunflower, rose, lavender Trees: cedar, horse chestnut, oak, sycamore Plants grow from seeds/bulbs A wild plant seed grows where it falls. It does not need to be planted or cared for as it grows. Garden plants are plants that people choose to grow in their gardens. Plants need sunlight, water, correct temperature, and nutrition to grow well. Plants are important in order for humans and other animals to survive 		
	Vocabulary: Plant, leaf, trunk, branch, root, seed, seedling, bulb, flower, stem, petal, wild, garden, evergreen, observe, grow, reproduce, compare, record, temperature, predict, measure, diagram,	ASSESSMENT: How many types of plant are there?	



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	germinate, shoot, earth, soil, fruit, produce, warmth, sunlight, living, not living, deciduous, dispersal, water, nutrition	
Year 2 	Declarative Knowledge Y2 <ul style="list-style-type: none"> Flowers make seeds to make more plants (reproduce) We can eat different parts of the plants (leaves, stems, roots, seeds, fruit) Seed dispersal is when the seeds move away from the parent plant. They can drop to the ground in the plant's fruit or be moved by the wind or animals. A deciduous tree loses its leaves each year and an evergreen tree keeps its green leaves all year round, even in the winter. 	
	Vocabulary: water, light, air, warm, cool, healthy, grow	ASSESSMENT: What should I do to grow a healthy plant?
End Point Milestone 1 Plants	<ul style="list-style-type: none"> Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers. 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. 	
Year 3 	Declarative Knowledge <ul style="list-style-type: none"> Plants are producers, they make their own food. (YEAR 1 AND 2: children should know that plants are living things need that they need certain things to survive) Their leaves absorb sunlight and carbon dioxide, and this is called photosynthesis The roots absorb water from the soil. The stem transports water to the leaves. Water evaporates from the leaves. This evaporation causes more water to be sucked up the stem. Know the Life Cycle of a Flowering Plant: Germination: The seed starts to grow. 	



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	<ul style="list-style-type: none"> • Growing and Flowering: The plant grows bigger and forms a flower. • Pollination: Pollen from the anther lands on the stigma and travels down the style. • Fertilisation and Seed Formation: The pollen joins with an ovule and a seed starts to form. • Seed Dispersal: The fully formed seeds are moved away from the parent plant. • Seed dispersal improves a plants chance of successful reproduction. The types of seed dispersal are water, wind, explosion, animals (eating and carrying) • Seeds/bulbs require water and warmth to germinate and grow. They then require light, nutrients, water and space. Seeds contain enough food for the plant's initial growth 	
	<p>Vocabulary: Nutrients, reproduction, pollination, dispersal, transportation, energy, seedling, carbon dioxide, oxygen, photosynthesis, roots, stem/trunk, leaves and flowers, pollen, ovule, seed, sugar (carbohydrates)</p>	<p>ASSESSMENT: Why do plants have flowers?</p>
<p>End Point</p> <p>Milestone 2 Plants</p>	<ul style="list-style-type: none"> • Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • Investigate the way in which water is transported within plants. • Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 	
<p>Future Learning</p>	<p>Y5: Living things & their habitats - describe the life process of reproduction in some plants and animals</p> <p>KS3: Reproduction - reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms</p>	



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PLANTS		
WORKING SCIENTIFICALLY		
	Investigations/Enquiries	NC Strands
Year 1	<p>Observation over time How does a daffodil bulb change over the year? How does my sunflower change each week? How does the oak tree change over the year?</p> <p>Pattern Seeking Do trees with bigger leaves lose their leaves first in autumn? Is there a pattern in where we find moss growing in the school grounds?</p>	<p>gather and record information/data</p> <p>observing changes closely, using simple equipment performing simple tests</p>
Year 2	<p>Pattern Seeking Do bigger seeds grow into bigger plants?</p> <p>Comparative & Fair Test Do cress seeds grow quicker inside or out?</p>	<p>ask simple questions</p> <p>observing changes closely, using simple equipment performing simple tests</p> <p>gather and record data to help answer the question</p>
Year 3	<p>Observation over time What happens to celery when it is left in a glass of coloured water? How do flowers in a vase change over time?</p>	<p>asking relevant questions</p> <p>set up simple practical enquiries making systematic and careful observations</p> <p>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment</p> <p>recording findings using simple scientific language, drawings, labelled diagrams keys, bar charts, and tables</p> <p>using results to draw simple conclusions</p>



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SCIENCE CURRICULUM MAP & PROGRESSION

BIOLOGY		PROGRESSION – ANIMALS INCLUDING HUMANS	
Reception 	Declarative Knowledge <ul style="list-style-type: none">• animals are living things• animals grow and change over time• animals all have a life cycle• animals need to be looked after to survive• Animals need feeding in order to survive• Some animals are kept as pets and some live in the wild or on farms• Some animals give birth to live young• Some animals lay eggs• Vets and farmers help to look after animals		
	Vocabulary: animal, bird, rabbit, dog, cat, fur, feathers, arm, leg, back, stomach, neck, head, sheep, cow, pig, duck, woodlouse, caterpillar, ladybird, moth		
Year 1 	Declarative Knowledge Y1 <ul style="list-style-type: none">• Animals need food to survive.• Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy.• Animals that mostly eat other animals (meat) are carnivores.• Animals that only eat plants are herbivores.• Animals that eat both plants and other animals are omnivores.• Amphibians live in the water as babies and on land as they grow older. They have smooth, slimy skin.• All birds have a beak, two legs, feathers and wings• Fish live and breathe under water. They have scaly skin, fins to help them swim and they breathe through gills.• Mammals are animals that breathe air, grow hair or fur and feed on their mother's milk as a baby.• All reptiles breathe air. They have scales on their skin.• Animals have senses to help individuals survive: sight, hearing, touch, taste and smell		



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	<p>Vocabulary: Birds, fish, mammal, reptile, herbivore, carnivore, omnivore, head, ear, mouth, shoulder, hand, fingers, leg, foot, eye, nose, teeth, elbow, thumb, knee, sight, hearing, touch, taste, smell</p>	<p>ASSESSMENT: What are animals like?</p>
<p>Year 2</p> 	<p>Declarative Knowledge Y2</p> <ul style="list-style-type: none"> • Some animals give birth to live young • Some animals lay eggs which the young hatch from • Both of these types of young then develop into adults • Some offspring look like their adult when they are born • Some adults do not look like their offspring when they are born • All young animals change as they go through the different stages of their life cycle and grow into adults • Know the human life cycle and a frog life cycle • All young animals change as they go through the different stages of their life cycle and grow into adults • To stay alive all animals have 3 basic needs for survival-air, water food • To grow into a healthy adult we must eat the right types on the right amount and exercise • Being active and exercising keeps our bodies and minds health • To stop germs from spreading it is important to be hygienic 	
	<p>Vocabulary: Adult, develop, life cycle, offspring, young, live young, diet, exercise, germs, hygiene, nutrition, air, water, food, carbohydrates, fruit, vegetables, protein, dairy,</p>	<p>ASSESSMENT : Do living things change or stay the same?</p>
<p>End Point</p> <p>Milestone 1</p>	<ul style="list-style-type: none"> • Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates • 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 (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets). 	



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<p>Animals including humans</p>	<ul style="list-style-type: none"> • Identify name, draw and label the basic parts of the human body and say which part of the body is associated with each sense • Notice that animals, including humans, have offspring which grow into adults • Investigate and describe the basic needs of animals, including 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. 	
<p>Year 3</p> 	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • Animals (including humans) are adapted to eat different types of nutrition – as they cannot make their own food • To know the different food groups and how they support a healthy diet <ul style="list-style-type: none"> ○ Carbohydrates – provide energy ○ Protein – helps growth and repair ○ Fibre - helps you to digest the food the food you have eaten ○ Fats – provide energy ○ Vitamins – keep you healthy ○ Minerals – keep you healthy • To stay healthy, humans need to exercise, eat a healthy diet and be hygienic. • Water – mover nutrients around your body and helps to get rid of waste • Many animals (including humans) have skeletons to support their bodies and protect vital organs. • Animals have muscles for support, protection and movement, they are connected to bones and move them when they contract. • Moveable joints connect bones. 	
	<p>Vocabulary: nutrition fibre joint vitamins water muscles - movement, pull, contract, minerals skeletons - support, protection relax fat skull - brain diet protein ribs - heart, lungs, carbohydrates, movement</p>	<p>ASSESSMENT Why do animals have skeletons? What is a healthy diet and why is it important?</p>
<p>Year 4</p>	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • Different types of teeth do different jobs: incisors, canines, molars and premolars. The former are used to break food apart and the latter for chewing. 	



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	<ul style="list-style-type: none"> • Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood and material that body cannot digestive is excreted • The blood takes nutrients around the body.
	<p>Vocabulary: Nutrients, nutrition, carbohydrates, protein, fats, vitamins, minerals, water, fibre, skeleton, bones, joints, muscles, contract, relax, digestive system, tongue, mouth, teeth, oesophagus, stomach, small intestine, large intestine, tooth, canine, incisor, molar, premolar, blood.</p> <p style="text-align: center;">ASSESSMENT: What do our bodies do with the food we eat?</p>
<p>End Point</p> <p>Milestone 2</p>	<ul style="list-style-type: none"> • Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat. • Construct and interpret a variety of food chains, identifying producers, predators and prey. • Identify that humans and some animals have skeletons and muscles for support, protection and movement. • 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.
<p>Year 5</p>  <p><i>link to PSHE</i></p>	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • Different animals mature at different rates and live to different ages: fertilisation — prenatal — infancy — childhood — adolescence — adulthood (early, middle & late). • Hormones control puberty changes which can be physical and/or emotional: <ul style="list-style-type: none"> ○ Emotional Changes: development of stronger feelings and emotions, mood swings, change in temperament, growing independence. ○ Physical changes: body growth, hair growth, sweat glands develop, voice box changes, skin becomes oilier and sexual organs develop. • Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction.



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	<p>Vocabulary: Foetus, embryo, womb, gestation, growth, development, puberty, hormone, physical, emotional, baby, adults, adolescent</p>	<p>ASSESSMENT: Why and how does the human body change over time?</p>
<p>Year 6</p> 	<ul style="list-style-type: none"> The heart pumps blood around the body. Oxygen is breathed through the lungs where it is absorbed into the blood. Muscles need oxygen to release energy from food to do work: <p>oxygen is taken into the blood in the lungs — the heart pumps the blood through blood vessels to the muscles — the muscles take oxygen and nutrients from the blood.</p>	<p>ASSESSMENT: How do our choices affect how our bodies work? Why does my heart beat?</p>
<p>End Point Milestone 3</p>	<ul style="list-style-type: none"> Describe the changes as humans develop to old age. Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions. Describe the ways in which nutrients and water are transported within animals, including humans. 	
<p>Future Learning</p>	<p>KS3: the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms</p> <p>the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)</p> <p>calculations of energy requirements in a healthy daily diet</p> <p>the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</p> <p>the structure and functions of the gas exchange system in humans, including adaptations to function</p> <p>the effects of recreational drugs (including substance misuse) on behaviour, health and life processes</p>	



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**ANIMALS INCLUDING HUMANS
WORKING SCIENTIFICALLY**

Year	Investigations/Enquiries	NC Strands
Year 1	<p>Identify, Classify & Group How can we organise all the zoo animals? What are the names for all the parts of our bodies?</p> <p>Comparative & Fair Test Is our sense of smell better when we cannot see?</p>	<p>Select appropriate yes/ no questions to aid sorting Be able to compare objects based on obvious, observable features such as size and colour. Sort objects and living things into two groups using a simple table. Talk about the number of objects in each group i.e., which has more or less Make simple observations of changes guided by prompt questions Use non-standard units to measure using simple equipment such as egg timers</p>
Year 2	<p>Observation over time How does a tadpole change over time? How much food and drink do I have over a week?</p> <p>Research What food do you need in a healthy diet and why? What do you need to do to look after a pet dog/cat/lizard and keep it healthy?</p>	<p>Ask one or two simple questions linked to a topic Use simple secondary sources to find answers. To find information from books and computers with help. Use secondary sources of information to help in answering questions. To observe changes over time and, with guidance, begin to notice patterns and relationships. Use observations and ideas to suggest answers to questions</p>
Year 3	<p>Pattern Seeking Do male humans have larger skulls than female humans?</p>	<p>Where appropriate take accurate measurements using standard units where not all the numbers are marked on the scale. Take repeated readings where necessary. Record data in own tables Present data in bar charts Refer directly to their evidence when answering their question Use results from an investigation to make a prediction about a further result Draw simple conclusions when appropriate for patterns</p>
Year 4	<p>Pattern Seeking Are foods that are high in energy always high in sugar?</p>	<p>Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations Recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations and choose a source from a range provided. Independently ask a range of relevant questions that will provide 'useful' results linked to a topic Decide what data to collect to identify naturally occurring patterns and relationships</p>



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		<p>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</p> <p>Say what was found out linking cause to effect</p> <p>Use straightforward scientific evidence to answer questions or to support their findings</p> <p>Suggest new questions arising from the investigation</p>
Year 5	<p>Research</p> <p>Why do people get grey/white hair when they get older?</p>	<p>To begin to explore ideas and ask own questions about scientific phenomena.</p> <p>To begin to plan different types of scientific enquiry to answer questions.</p> <p>Choose suitable sources and begin to separate opinion from fact. Begin to recognise which secondary sources will be most useful to research their ideas.</p> <p>Begin to choose an appropriate form of presentation including scatter graphs</p> <p>Be able to answer their questions using scientific evidence gained from a range of sources</p> <p>Separate opinion from fact in conclusions</p> <p>Be able to talk about their degree of trust in the sources they used</p> <p>Identify scientific evidence that has been used to</p>
Year 6	<p>Pattern Seeking</p> <p>Is there a pattern between what we eat for breakfast and how fast we can run?</p> <p>Comparative & Fair Test</p> <p>How does the length of time we exercise for affect our heart rate?</p> <p>Can exercising regularly affect your lung capacity?</p> <p>Which type of exercise has the greatest effect on our heart rate?</p>	<p>Choose suitable sources and begin to separate opinion from fact.</p> <p>Begin to recognise which secondary sources will be most useful to research their ideas.</p> <p>Ask a range of questions and identify the type of enquiry that will help to answer the questions</p> <p>Make decisions about how long to make observations for</p> <p>Choose how to record data from a choice of familiar approaches.</p> <p>Prepare own tables to record data, including columns for taking repeat readings</p> <p>Use test results and previous scientific knowledge to make predictions for further investigations asking specific, relevant questions</p> <p>Draw conclusions based on their data and observations, use evidence to justify their ideas, use scientific knowledge and understanding to explain their findings</p> <p>Be able to answer their questions using scientific evidence gained from a range of sources</p> <p>Separate opinion from fact in conclusions</p> <p>Be able to talk about their degree of trust in the sources they used</p>



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BIOLOGY		PROGRESSION – LIVING THINGS & THEIR HABITATS	
<p style="text-align: center;">Reception</p> <div style="display: flex; justify-content: space-around;">   </div>	Know that all living things and the natural environment needs to be respected		
	<p>Vocabulary: care, respect, natural</p>		
<p style="text-align: center;">PRIOR LEARNING</p>	<p>Y1: Plants - 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 Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>Y1: Seasonal Changes - Observe changes across the four seasons</p> <p>Y1: Animals inc humans -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)</p>		
<p style="text-align: center;">Year 2</p> <div style="display: flex; justify-content: space-around;">   </div>	<p>Declarative Knowledge</p> <p>KS1</p> <ul style="list-style-type: none"> • These are the things that all living things do . They move, breathe, sense, grow, make babies, get rid of waste and get their energy from food. • Things that are living that all have all of the life processes. • Things that are dead were once living. They did have all of the life processes but don't now. • Things made out of metal, plastic, or rock were never living. They never had the life processes. • A food chain shows how each animal gets its food. Food chains are one of the ways that living things depend on each other to stay live. • A food source is the place a living things' food comes from. • A habitat is the natural place something lives. Habitats: woodland, urban, coastal, coastal, rainforest, arctic, desert, ocean, river, mountain • A habitat provides living things with everything they need to survive such as food, shelter and water. 		



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	<ul style="list-style-type: none"> • A micro habitat is a very small habitat in places like under a rock, under leaves, or on a branch. Micro-habitats: short grass, flowers, inside rotting wood, under leaves, in and on soil • Minibeasts live in micro-habitats. The micro habitats have everything they need to survive. • Many living things in a habitat depend on each other. This means they need each other for different things. 		
	<table border="1" style="width: 100%;"> <tr> <td data-bbox="385 534 1254 630"> Vocabulary: survive, depend, microhabitat, habitat, food sources, food chain, dead, living, life processes, never living </td> <td data-bbox="1254 534 2107 630"> ASSESSMENT: Why do different animals live in different places? </td> </tr> </table>	Vocabulary: survive, depend, microhabitat, habitat, food sources, food chain, dead, living, life processes, never living	ASSESSMENT: Why do different animals live in different places?
Vocabulary: survive, depend, microhabitat, habitat, food sources, food chain, dead, living, life processes, never living	ASSESSMENT: Why do different animals live in different places?		
<p style="background-color: red; color: black; padding: 2px;">End Point</p> <p>Milestone 1 Living Things & their Habitats</p>	<ul style="list-style-type: none"> • Explore and compare the differences between things that are living, that are dead and 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 micro-habitats • 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>Year 4</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • There are many ways of grouping living things and scientists have different ways of doing this • Living things can be grouped into plant and animals • Plants can be grouped into flowering and non-flowering • Animals can be grouped into vertebrates (backbone) and invertebrates (no backbone) • Vertebrates are separated into mammals, fish, birds, reptiles and amphibians • Invertebrates can be grouped into insects, spiders, worms, molluscs (snail & slugs) • Different groups of animals (& plants) have different characteristics • Classification keys can be used to sort groups of animals and plants • Nutrients produced by plants move to primary consumers then to secondary consumers through food chains • Food chains are made up of producers, predators and prey. • Changes to an environment can be natural or caused by humans. Changes to an environment can have positive as well as negative effects. • Natural: earthquakes, storms, floods, droughts, wildfires, the seasons 		



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	<ul style="list-style-type: none"> • Human made: Deforestation, pollution, urbanisation, the introduction of new animal or plant species to an environment, creating new nature reserves 	
<p>End Point</p> <p>Milestone 2</p>	<ul style="list-style-type: none"> • Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys. • Recognise that environments can change and that this can sometimes pose dangers to specific habitats. 	<p>ASSESSMENT: Are living things in danger?</p>
<p>Year 5</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	<ul style="list-style-type: none"> • Living things have different life cycles. • Different animals mature at different rates and live to different ages. • The process of reproduction in plants is called pollination, where pollen reaches the new flower and travels to the ovary where it fertilises egg cells (ovules) to make seeds. • During sexual reproduction between a male and a female, a sperm from the male joins with an egg from the female – this is called fertilisation. • After fertilisation, females will either lay eggs or carry their growing embryo until developed enough to be born. • Some organisms reproduce sexually, where offspring inherit information from both parents. • Some organisms reproduce asexually, making a copy of a single parent. • Environmental change can affect how well an organism is suited to its environment. 	<p>ASSESSMENT: Do all plants and animals reproduce in the same way?</p>
<p>Year 6</p>	<p>Declarative knowledge</p> <ul style="list-style-type: none"> • Variation exists within a population (and between offspring of some plants). • Organisms best suited to their environment are more likely to survive long enough to reproduce. • Organisms which are best adapted to reproduce are more likely to survive as a species. 	



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 	<ul style="list-style-type: none"> Organisms reproduce and offspring have similar characteristic patterns. Competition exists for resources and mates. 	<p>ASSESSMENT: In what ways can we sort living things?</p>
<p>End Point</p> <p>Milestone 3</p>	<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. Describe how living things are classified into broad groups according to common observable characteristics. Give reasons for classifying plants and animals based on specific characteristics. 	
<p>Future Learning</p>	<p>KS3: Reproduction</p> <ul style="list-style-type: none"> reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms 	



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LIVING THINGS AND THEIR HABITATS WORKING SCIENTIFICALLY		
	Investigations/Enquiries	NC Strands
Year 2	<p>Identify, Classify & Group How would you group these plants and animals based on what habitat they live in? What patterns do you find?</p>	<p>Ask simple yes/no questions recognising that they can be answered in different ways Use observations and ideas to suggest answers to questions</p>
Year 4	<p>Identify, Classify & Group Can we use the classification keys to identify all the animals that we caught pond dipping?</p>	<p>Ask a range of yes/no questions Record findings on a Carroll diagram with labelled headings Use secondary sources when needed to find out more information</p>
Year 5	<p>Identify, Classify & Group Compare this collection of animals based on similarities and differences in their lifecycle.</p> <p>Research</p>	<p>asking relevant questions to support with sorting record findings using simple scientific language on a Carroll diagram Choose suitable sources and begin to separate opinion from fact. Begin to recognise which secondary sources will be most useful to research their ideas. Separate opinion from fact in conclusions. Be able to talk about the reliability of their sources</p>
Year 6	<p>Identify, Classify & Group How would you make a classification key for vertebrates/invertebrates or microorganisms?</p> <p>Research</p>	<p>asking relevant questions and justify these Identify specific clear questions that will help to sort without ambiguity using keys To apply knowledge of previous enquiry to compare and classify Create branching databases (tree diagrams) and keys to enable others to name living things and objects Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for.</p>



ST DAVID'S CE PRIMARY SCHOOL

SCIENCE CURRICULUM MAP & PROGRESSION

BIOLOGY		PROGRESSION – EVOLUTION & INHERITANCE	
Prior Learning		<p>(Y2 – Living things and their habitats): 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>(Y2 – Animals, including humans): Notice that animals, including humans, have offspring which grow into adults</p> <p>(Y3 – Plants): Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p> <p>(Y3 – Rocks): Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>(Y4 – Living things and their habitats): Recognise that environments can change and that this can sometimes pose dangers to living things</p> <p>(Y5 – Living things and their habitats): Describe the life process of reproduction in some plants and animals</p>	
<p>Year 6</p>  		<p>Declarative Knowledge</p> <ul style="list-style-type: none"> Life cycles have evolved to help organisms survive to reproduce. Over time the characteristics that are most suited to the environment become increasingly common <p><i>N.B: The following could be duplicated in Year 6/Year B Investigating Living Things</i></p> <ul style="list-style-type: none"> Organisms best suited to their environment are more likely to survive long enough to reproduce. Organisms which are best adapted to reproduce are more likely to survive as a species. Organisms reproduce and offspring have similar characteristic patterns. Competition exists for resources and mates 	
		<p>Vocabulary: Fossils, adaptation, evolution, characteristics, reproduction, genetics, variation, inherited, environmental, mutation, competition, natural selection, evidence, organism</p>	<p>ASSESSMENT: What is evolution, how does it happen and how do scientists know?</p>
<p>End Point Milestone 3 Evolution & 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 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. 	



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SCIENCE CURRICULUM MAP & PROGRESSION

<p>Future Learning</p>	<p>KS3:</p> <ul style="list-style-type: none"> • Heredity as the process by which genetic information is transmitted from one generation to the next • A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model • The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection <p>Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction</p>
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<p>EVOLUTION & INHERITANCE WORKING SCIENTIFICALLY</p>		
	<p>Investigations</p>	<p>NC Strands</p>
<p>Year 6</p>	<p>Research What happened when Charles Darwin visited the Galapagos islands? What ideas did American geneticist Barbara McClintock have about genes that won her a Nobel Prize? Comparative & Fair Test What is the most common eye colour in our class?</p>	<p>Identify when questions are asked appropriately answered through research Find things out using a wide range of secondary sources of information identifying the reliability of different sources Recognise which secondary sources will be most useful to research their ideas Choose how to record data from a choice of familiar approaches Identify the degree of trust in findings. Identify scientific evidence that has been used to support or refute ideas or arguments. Describe and evaluate their own and other people's scientific ideas related to topic in the national curriculum (including ideas that have changed over time), using evidence from a range of sources. Use test results and previous scientific knowledge to make</p>



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SCIENCE CURRICULUM MAP & PROGRESSION

PHYSICS		PROGRESSION – SOUND	
PRIOR LEARNING	Y1: <i>Animals, including humans: Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</i>		
Year 4 	Declarative Knowledge <ul style="list-style-type: none"> • Sound travels from its source in all directions and we hear it when it travels to our ears. • Sound travel can be blocked. • Sound is produced when an object vibrates. • Sound moves through all materials by making them vibrate. • Changing the way an object vibrates changes its sound. • Bigger vibrations produce louder sounds • Smaller vibrations produce quieter sounds. • Faster vibrations (higher frequencies) produce higher pitched sounds 		
	Vocabulary: Volume, vibration, pitch, high, low, sound wave, source		ASSESSMENT: How can we make different sounds?
End Point Milestone 2	Understanding sound and hearing <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. 		



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SCIENCE CURRICULUM MAP & PROGRESSION

PHYSICS		PROGRESSION – SEASONAL CHANGES	
<p>RECEPTION</p> <p><i>How does the world around us change with the seasons?</i></p> <div style="text-align: center;">  <p>Light</p> </div>		<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • There are four seasons in a year • These are spring, summer, autumn and winter • Each season lasts for 3 months (autumn – Sept, Oct, Nov winter – December, January, February spring – March, April May summer – June, July, August) • They follow a cyclical pattern each year • The worlds around us looks and feels different each season • Each season the weather changes • Each season plants and trees look different • Animals are affected by seasonal change • We wear different clothes in each season • Each season has special events (Easter, Christmas, Harvest) • We have five senses (touch, sight, taste, smell, hearing) • We can use our senses to explore the world around us 	
		<p>Vocabulary: Seasons, autumn, winter, spring, summer, change, similar, different, colours, weather, rain, sun, wind, snow, hail, cloud, ice, frosty, thunder, rainbows, cold, warm, hot, heatwave, predict, observe Senses, sight, touch, smell, taste, hear, listen, eyes, nose, mouth, lips, tongue, ears, fingers, observe, feels, feeling, Clothing, suitable, waterproof, materials, safety, sunscreen, sunglasses, hat, gloves, scarf</p>	
<p>Year 1</p>	<p>Declarative Knowledge Y1</p> <ul style="list-style-type: none"> • In the UK there are 4 seasons each year, autumn, winter, spring and summer • In autumn, the weather begins to get colder, the leaves start to fall from the trees. The amount of daylight becomes less. this means the day times are shorter and the night times are longer. 		



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SCIENCE CURRICULUM MAP & PROGRESSION

	<ul style="list-style-type: none"> • Winter-the weather is much cold. Sometimes it is cold enough to freeze, leaving frost and ice on the ground. It sometimes snows. Many trees have bare branches as all their leaves have fallen off. The day times are the shortest in the year and the night times are the longest. • The weather includes the temperature outside, The wind direction and strength, as well as rain, cloud, snow and sun. • Daylight is when it is light outside. The amount of daylight changes with each season. • In spring the weather starts to get warmer. The leaves begin to grow on the trees and some trees may blossom (have flowers). Plants begin to grow and you may see baby animals like lambs around. The day times start to get longer. • In summer, the weather gets hotter. The daytime is long and the nights are short. Summer has the longest days. The trees are full of leaves and there are lots of flowers, bees, butterflies and other insects. 	
	Vocabulary: <i>season, winter, spring, summer, autumn, temperature, daylight</i>	ASSESSMENT: <i>What is it like in winter, spring, summer and autumn?</i>
End Point Milestone 1	Understanding the Earth's movement in space <ul style="list-style-type: none"> • Observe the apparent movement of the Sun during the day. • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. 	
Year 4 	Declarative Knowledge <ul style="list-style-type: none"> • There must be light for us to see. • Without light it is dark. • Light from the sun can be dangerous • Transparent materials let light travel through them • Opaque materials don't let light through. • Beams of light bounce off surfaces (reflection). • Shiny materials reflect light beams better than non-shiny materials • Light comes from a source • shadows are formed when the light from a light source is blocked by an opaque object • A shadow is larger when an object is closer to the light source because it blocks more of the light 	
	Vocabulary: Light source, reflect, ray, mirror, bounce, visible, beam, glare, travel, straight, opaque, shadow, block, transparent, translucent	ASSESSMENT: <i>What is a shadow?</i>



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SCIENCE CURRICULUM MAP & PROGRESSION

<p>End Point Milestone 2</p>	<ul style="list-style-type: none"> • 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 a solid object. • Find patterns in the way that the size of shadows change. 	
<p>Year 6</p> 	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • Light travels in straight lines. • Animals see light sources when light travels from the source into their eyes. • Animals see objects when light is reflected from that object and enters their eyes. • Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light, so we do not see the beam. • A shadow is always the same shape as the object that casts it • Shadows can be elongated or shortened depending on the angle of the light source. 	<p>ASSESSMENT: Why does my shadow change length over the course of a day?</p>
<p>End Point Milestone 3</p>	<p>Vocabulary: Light, beam, reflect, reflection, opaque, mirror, source, reflected, travel, block, ray, bounce, visible, straight, shadow, transparent, translucent, absorb, emit, scatter, refraction</p> <ul style="list-style-type: none"> • Understand 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 eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes. • 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>Future Learning</p>	<p>KS3: the seasons and the Earth's tilt, day length at different times of year, in different hemispheres</p>	



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SCIENCE CURRICULUM MAP & PROGRESSION

SEASONAL CHANGES WORKING SCIENTIFICALLY		
	Investigations	NC Strands
Year 1	<p>Observation over time How does the colour of a UV bead change over the day? How does the weather and length of day change throughout the seasons?</p>	<p>perform a simple test observe changes gather and record data in pictogram with support talk about what happened in my investigation</p>
Year 3	<p>Pattern seeking Are you more likely to have bad eyesight and to wear glasses if you are older? Observation over time When is our classroom darkest? Is the Sun the same brightness all day? Comparative & Fair Test How does the distance between the shadow puppet and the screen affect the size of the shadow? Which pair of sunglasses will be best at protecting our eyes?</p>	<p>Where appropriate take accurate measurements using standard units where not all the numbers are marked on the scale. Take repeated readings where necessary. Learn to use some new equipment such as data loggers, thermometers and hand lenses. Present data in bar charts Prepare own tables to record data Begin to see a pattern in my results. Refer directly to their evidence when answering their question Use results from an investigation to make a prediction about a further result Begin to look for naturally occurring patterns and relationships</p>
Year 6	<p>Pattern seeking Is there a pattern to how bright it is in school over the day? And, if there is a pattern, is it the same in every classroom? Comparative & Fair Test How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface?</p>	<p>Use appropriate scientific language and ideas to communicate his/ her methods Choose how to record data from a choice of familiar approaches Use test results and previous scientific knowledge to make predictions for further investigations asking specific, relevant questions. Use test results and previous scientific knowledge to make predictions for further investigations asking specific, relevant questions.</p>



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SCIENCE CURRICULUM MAP & PROGRESSION

	Which material is most reflective?	<p>Draw conclusions based on their data and observations, use evidence to justify their ideas, use scientific knowledge and understanding to explain their findings.</p> <p>Look for different causal relationships in their data and identify evidence that refutes or supports their ideas. Use their results to identify when further tests and observations are needed.</p>
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PHYSICS PROGRESSION – FORCES	
Reception <i>How do things move?</i>	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • We can move objects by pushing and pulling • We can make objects move faster by pushing or pulling harder • We can make objects move slower by pushing or pulling more gently • We can change the direction that objects move in • We can change the shape some objects by twisting, bending, folding, curling, rolling • Some of these changes are reversible, some are irreversible • Some objects can float on water whilst other sink under the water • The weight and size of an object can affect how the object moves • Some materials are magnetic • Magnets can make magnetic objects move and change direction <p>Vocabulary: Check, describe, explain, hypothesise, observe, predict, force, object, move, pull, push, twisting, bending, folding, curling, rolling, float, sink, heavy, light, weight, magnet, magnetic, non-magnetic, metal, material, direction, change direction, fast, slow, speed</p>



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SCIENCE CURRICULUM MAP & PROGRESSION

<p>Year 3</p> 	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • Different surfaces create different amounts of friction • The amount of friction created by an object moving over a surface depends on the roughness of the surface and the object, and the force between them • Forces change the motion of an object. They will either make it start to move, speed up, slow it down or even make it stop • Not all metals are magnetic • A magnetic field is invisible • Like poles repel • Opposite poles attract • A needle in a compass is a magnet • A compass always points north-south on Earth 	
	<p>Vocabulary: forces, friction, surface, magnet, magnetic, magnetic field, poles, repel, attract</p>	<p>ASSESSMENT: How can we move magnets?</p>
<p>End Point Milestone 2</p>	<ul style="list-style-type: none"> • 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 repel each other, depending on which poles are facing. 	



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SCIENCE CURRICULUM MAP & PROGRESSION

<p>Year 5</p> 	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • Gravity is a pulling force exerted by the Earth (or anything else which has mass) • Weight is how strongly gravity is pulling an object down. It is measured in Newtons. • Isaac Newton is famously thought to have developed his theory of gravity when he saw an apple fall to the ground from an apple tree • Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. • Friction is a force against motion caused by two surfaces rubbing against each other. • Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move 	
<p>End Point Milestone 3</p>	<p>Vocabulary: Air resistance, water resistance, friction, gravity, Newton meter, gears, pullies, force, push, pull, opposing, streamline, brake, mechanism, lever, cog, machine, pulley, mass</p>	<p>ASSESSMENT: How and why do objects move?</p>
<p>Future Learning KS3</p>	<ul style="list-style-type: none"> • opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface • forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) • change depending on direction of force and its size. 	



ST DAVID'S CE PRIMARY SCHOOL

SCIENCE CURRICULUM MAP & PROGRESSION

WORKING SCIENTIFICALLY: FORCES

WORKING SCIENTIFICALLY: FORCES		
	Investigations	NC Strands
Year 3	<p>Research</p> <p>How have our ideas about forces changed over time? How does a compass work?</p> <p>Identify, Classify & Group</p> <p>Which materials are magnetic?</p> <p>Comparative & Fair Test</p> <p>How does the mass of an object affect how much force is needed to make it move? Which magnet is strongest? Which surface is best to stop you slipping?</p>	<p>Choose a source from a range provided. Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations</p> <p>Be able to put appropriate headings onto intersecting Venn diagrams</p> <p>Make a range of relevant observations using simple equipment with support. Present observations in labelled diagrams</p> <p>Be able to compare objects based on more sophisticated, observable features</p> <p>Be able to answer their questions using simple scientific language</p> <p>Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs</p>
Year 5	<p>Observation over time</p> <p>How long does a pendulum swing for before it stops?</p> <p>Pattern Seeking</p> <p>Do all objects fall through water in the same way? How does surface area of parachute affect the time it takes to fall?</p>	<p>Ask further questions based on results. Recognise and control variables where necessary. To begin to decide which variables to control.</p> <p>Make decisions about what observations to make, measurements to take and how long to make them for</p> <p>Take repeat readings where appropriate.</p> <p>Measure using standard units using equipment that has scales involving decimals.</p> <p>Prepare own tables to record data, including columns for taking repeat readings</p> <p>Begin to choose an appropriate form of presentation including scatter graphs</p> <p>Be able to answer their questions identifying patterns</p> <p>Provide oral or written explanations for their findings</p> <p>Explain their degree of trust in their results including the precision in taking measurements and accuracy of results.</p>



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SCIENCE CURRICULUM MAP & PROGRESSION

PHYSICS		PROGRESSION – EARTH & SPACE	
PRIOR LEARNING	<p>Y1: Understand changes in weather patterns and seasons.</p> <p>Y3: Compare how things move on different surfaces.</p> <ul style="list-style-type: none"> • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing 		
<p>Year 6</p> 	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • The Earth, Moon and Sun are all approximate spherical bodies. • The Sun is a star at the centre of the solar system, and it has 8 planets that orbit it. Mercury, Venus, Earth and Mars are rocky planets (mostly made up of metal and rock); Jupiter, Saturn, Uranus and Neptune are mostly made up of gases (helium and hydrogen). • The Earth rotates (spins) on its axis. It does a full rotation once in every 24 hours. • Daytime occurs when the side of the Earth is facing towards the Sun. Night occurs when the side of Earth is facing away from the Sun. It appears to us that the Sun moves across the sky during the day, but the Sun does not move at all. It seems to us that the Sun moves because of the movement of the Earth. • At the same time that Earth is rotating, it is orbiting around the Sun. It takes a little more than 365 days for the Earth to orbit the Sun. • The Moon orbits Earth in an oval shaped path whilst spinning on its axis. At various times in the month, the Moon appears to be different shapes. This is because as the Moon rotates around the Earth the Sun lights up different parts of it. 		
	<p>Vocabulary: Earth, sun, moon, sphere, revolve, orbit, rotate, axis, sunrise, sunset, north, south, east, west, light source, shadow, phase, constellation, waxing, waning, crescent, gibbous, solar system, geocentric, heliocentric</p>	<p>ASSESSMENT: Sun, Earth & Moon: What is moving and how do we know?</p>	
End Point Milestone 3	<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. 		



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SCIENCE CURRICULUM MAP & PROGRESSION

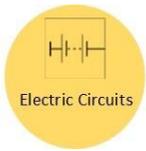
<p>Future Learning KS3</p>	<ul style="list-style-type: none"> • Gravity force, weight = mass x gravitational field strength (g), on Earth $g=10$ N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) • Our Sun as a star, other stars in our galaxy, other galaxies • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres the light year as a unit of astronomical distance
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WORKING SCIENTIFICALLY EARTH & SPACE		
	Investigations	NC Strands
<p>Year 6</p>	<p>Research What unusual objects did Jocelyn Bell Burnell discover? How do astronomers know what stars are made of? How have our ideas about the solar system changed over time? Comparative & Fair Test How does the length of daylight hours change in each season?</p>	<p>Choose suitable sources and begin to separate opinion from fact. Begin to recognise which secondary sources will be most useful to research their ideas Prepare own tables to record data, including columns for taking repeat readings Be able to answer their questions using scientific evidence gained from a range of sources Separate opinion from fact in conclusions Be able to talk about their degree of trust in the sources they used</p>



ST DAVID'S CE PRIMARY SCHOOL

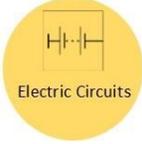
SCIENCE CURRICULUM MAP & PROGRESSION

PHYSICS		PROGRESSION – ELECTRICITY	
PRIOR LEARNING	Reception: <ul style="list-style-type: none"> • May have some understanding that objects need electricity to work. • May understand that a switch will turn something on or off. 		
Year 4 	Declarative Knowledge <ul style="list-style-type: none"> • A source of electricity (mains of battery) is needed for electrical devices to work. • Electricity sources push electricity round a circuit. • More batteries will push the electricity round the circuit faster. • Devices work harder when more electricity goes through them. • A complete circuit is needed for electricity to flow and devices to work. • Some materials allow electricity to flow easily, and these are called conductors. • Materials that don't allow electricity to flow easily are called insulators 		
	Vocabulary: Electricity, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component.	ASSESSMENT: What can we do with electricity?	
End Point Milestone 2	<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 loop with a battery. • 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. 		
Year 6	Declarative Knowledge <ul style="list-style-type: none"> • An electronic circuit is composed of individual components such as: lamp/bulb, wire, motor, buzzer, switch, cell, battery. • Circuit symbols are used in circuit diagrams to represent electronic components. • A cell and batteries are stores of energy. Energy pushes electricity round the circuit. When the battery or cell's energy is gone it stops pushing. 		



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SCIENCE CURRICULUM MAP & PROGRESSION

 <p>Electric Circuits</p>	<ul style="list-style-type: none"> • Voltage measures the 'push.' The greater the current flowing through a device the harder it works (for example a bulb will become brighter or a buzzer will become louder) • Current is how much electricity is flowing round a circuit. When current flows through wires heat is released. The greater the current, the more heat is released. • Lengthening or shortening the wires in a circuit will affect the level of resistance electrons have to flow through (this will impact the brightness of a bulb or volume of a buzzer). 	
	<p>Vocabulary: Circuit, conductor, insulator, symbol, electricity, component, voltage, neutrons, protons, electrons, atom, nucleus, current, crocodile clips, wires, bulb, battery, cell, motor, buzzer, switch</p>	<p>ASSESSMENT: Can we vary the effects of electricity?</p>
<p>End Point Milestone 3</p>	<p>Understanding electrical circuits</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. • Use recognised symbols when representing a simple circuit in a diagram. 	

WORKING SCIENTIFICALLY ELECTRICITY		
	Investigations	NC Strands
<p>Year 4</p>	<p>Pattern Seeking Which room has the most electrical sockets in a house?</p> <p>Comparative & Fair Test How does the thickness of a conducting material affect how bright the lamp is? Which metal is the best conductor of electricity?</p> <p>Observation over time</p>	<p>Decide what to measure or observe in order to answer a question. Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. Choose from a selection of equipment to use. Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Use ICT package to present data as a scattergram</p>



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SCIENCE CURRICULUM MAP & PROGRESSION

	How long does a battery light a torch for?	Identify differences, similarities or changes related to simple scientific ideas and processes
Year 6	Comparative & Fair Test How does the voltage of the batteries in a circuit affect the brightness of the lamp? How does the voltage of the batteries in a circuit affect the volume of the buzzer? Which make of battery lasts the longest? Which type of fruit makes the best fruity battery? Observation over time How does brightness of bulb change as the battery runs out? How can we measure how quickly a battery is used up?	To decide which variables to control Take repeated readings and compare results - discussing using scientific language the reasons for differences. Take accurate and precise measurements (N, g, kg, mm, cm, mins, seconds, cm ² V, km/h, m per sec, m/ sec) Choose how to record data from a choice of familiar approaches. Use test results and previous scientific knowledge to make predictions for further investigations asking specific, relevant questions. Use test results and previous scientific knowledge to make predictions for further investigations asking specific, relevant questions. Draw conclusions based on their data and observations, use evidence to justify their ideas, use scientific knowledge and understanding to explain their findings.



ST DAVID'S CE PRIMARY SCHOOL

SCIENCE CURRICULUM MAP & PROGRESSION

CHEMISTRY		PROGRESSION – MATERIALS	
PRIOR LEARNING	In Early Years children should: <ul style="list-style-type: none">• be able to ask questions about the place they live.• Talk about why things happen and how things work.• Discuss the things they have observed such as natural and found objects.• Manipulates materials to achieve a planned effect.		
Year 1 	Declarative Knowledge		
	Everyday materials <ul style="list-style-type: none">• Materials are what an object is made from.• There are many different materials including water, wood, glass, metal, plastic, brick, fabric, stone and paper.• Materials have different properties. Some properties include hard, soft, stretchy, shiny, smooth, dull and rough.• Smooth objects have no lumps or bumps.• Bendy things can be bent easily into a curved or folded shape.• If something is waterproof it keeps water out, it keeps things dry.• If something is absorbent, it does not soak up liquid.• Transparent objects can be seen through.• Opaque objects can't be seen through.		
	Vocabulary: Object, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent, transparent, opaque, fabric, rubber, cars, rock, paper, cardboard, wood, metal, plastic, glass, brick, twist, squash, bend, stretch, matches, cans, spoons. Properties, suitability, strong, weak, flexible, lightweight, hard-wearing, warm, elastic, materials, natural, man-made, manufactured, change, magnetic, clay, sand	ASSESSMENT: What are the things I use made from?	



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<p>Year 2</p> 	<p>Declarative Knowledge Uses of materials</p> <ul style="list-style-type: none"> • Some materials are found naturally in the environment such as water, rock, wood. • Manmade materials have been made by people. • Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass). • The properties of a material determine whether they are suitable for a purpose. • Suitability means having the properties which are right for a specific purpose • This is what a material is like and how it behaves • Materials can be changed by using physical force such as twisting, bending, squashing and stretching. 	
	<p>Vocabulary: suitability, strong, weak, flexible, lightweight, hard-wearing, warm, elastic, materials, natural, man-made, manufactured, change, magnetic, clay, sand</p>	<p>ASSESSMENT Can we change materials? How do we choose the best material?</p>
<p>End Point</p> <p>Milestone 1</p>	<p>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. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses. 	
<p>Year 6</p>	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> • Sometimes mixed substances react to make a new substance. These changes are usually irreversible. • Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible. • Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature) 	



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SCIENCE CURRICULUM MAP & PROGRESSION

 <p>Materials</p>	<ul style="list-style-type: none"> • If it is not possible to get the material back easily it is likely that it is not there anymore and something new has been made (irreversible change) • When two or more substances are mixed and remain present the mixture can be separated. • Some changes can be reversed, and some cannot. • Materials change state by heating and cooling. • All matter (including gas) has mass. 	
	<p>Vocabulary: Evaporate, condense, state, solid, liquid, gas, conditions, solidify, air, oxygen, carbon dioxide, properties, dissolve, solution, separate, filter, particles, materials, matter, temperature, process, water vapour, energy, precipitation, transparency, conductivity, insoluble, suspension, chemical, physical, irreversible, reversable, insulator, permeable, soluble</p>	<p>ASSESSMENT: How can we change materials reversibly and irreversibly?</p>
<p>End Point</p> <p>Milestone 3</p>	<ul style="list-style-type: none"> • Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. • Understand how 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, oxidation and the action of acid on bicarbonate of soda 	
<p>Future Learning</p>	<p>In KS3 children will learn about:</p> <ul style="list-style-type: none"> • the concept of a pure substance mixtures, including dissolving • diffusion in terms of the particle model • simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography • the identification of pure substances 	



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WORKING SCIENTIFICALLY MATERIALS		
	Investigations	NC Strands
Year 1	<p>Comparative & Fair Test Which materials are the most flexible? Which materials are the most absorbent?</p> <p>Pattern Seeking Is there a pattern in the types of materials that are used to make objects in a school?</p>	<p>To ask a few simple questions about the world around us. As part of a group choose equipment to use, decide what to do and what to observe or measure, in order to answer the question Make simple observations of changes guided by prompt questions. Use non-standard units to measure using simple equipment such as egg timers. Begin to say what happened in my investigation</p>
Year 2	<p>Pattern Seeking How do materials change with heat? <i>leave outside in sunshine/windowsill/radiator</i> How does amount of water affect the strength of a kitchen towel?</p>	<p>Ask a question about what might happen in the future based on observation Perform simple comparative tests choosing equipment to use, what to measure or observe in order to answer a question. Know how to use simple equipment safely e.g. hand lenses and egg timers Use measurements and equipment with increasing independence. Begin to progress from non-standard units to reading mm, cm, m, ml, l, °C Answer their question in simple sentences using their observations or measurements Begin to spot simple patterns e.g. making links between properties and objects</p>
Year 6	<p>Comparative & Fair Test How does the temperature of tea affect how long it takes for a sugar cube to dissolve? Which type of sugar dissolves the fastest?</p>	<p>Take measurements using a range of scientific equipment with increasing accuracy and precision. Learn how to use a range of (new) equipment to make measurements with increasing precision.</p>



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	<p>Observation over time</p> <p>How does a container of saltwater change over time? How does a sugar cube change as it is put in a glass of water?</p>	<p>Measure using standard units (N, g, kg, mm, cm, mins, seconds, cm²V, km/h, m per sec, m/ sec) using equipment that has scales involving decimals.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables</p> <p>Be able to answer their question, describing causal relationships</p> <p>Use test results to make predictions for further tests</p>
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CHEMISTRY PROGRESSION – ROCKS	
<p>PRIOR LEARNING</p>	<p>In Year 2 children should:</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 cardboard for particular uses. Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. <p>Children may:</p> <ul style="list-style-type: none"> May have some understanding of a variety of different rocks in the natural world. Some understanding of what soil is. (how to identify soil etc) May have some knowledge of what a fossil is.
<p>Year 4</p>  <p>Materials</p>	<p>Declarative Knowledge</p> <ul style="list-style-type: none"> Name the three naturally occurring rocks: <ul style="list-style-type: none"> Igneous rock - Rock that has been formed from magma or lava. Sedimentary rock - Rock that has been formed by layers of sediment being pressed down hard and sticking together. You can see the layers of sediment in the rock. Metamorphic rock - Rock that started out as igneous or sedimentary rock but changed due to being exposed to extreme heat or pressure. Use these words to discuss the properties of rocks: hard, soft, permeable, impermeable, durable (meaning resistant to weathering), high density, low density. Density measures how 'bulky' the rock is (how tightly packed the molecules are).



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	<ul style="list-style-type: none"> Physical properties of some rocks are as a result of their formation Soils are made from rocks and organic matter Fossils are formed when things that have lived are trapped within sedimentary rock Fossils provide evidence that living things have changed over time
	<p>Vocabulary: Rocks, igneous, metamorphic, sedimentary, permeable, impermeable, organic matter, magma, lava, sediment Rocks, igneous, metamorphic, sedimentary, permeable, impermeable, organic matter, magma, lava, sediment</p> <p>ASSESSMENT: What are rocks and soils like?</p>
End Point	Rocks
Milestone 2	<ul style="list-style-type: none"> Compare and group together different kinds of rocks on the basis of their simple, physical properties. Relate the simple physical properties of some rocks to their formation (igneous or sedimentary). Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock. Recognise that soils are made from rocks and organic matter.
Future Learning	Y6: Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.

WORKING SCIENTIFICALLY
ROCKS

	Investigations	NC Strands
Year 4	<p>Comparative & Fair Test</p> <p>How does adding different amounts of sand to soil affect how quickly water drains through it? Which soil absorbs the most water?</p> <p>Identify, Classify & Group</p>	<p>Ask a range of questions linked to a topic</p> <p>Choose what to change</p> <p>Make a range of relevant observations using simple equipment with support. Present observations in labelled diagrams</p> <p>Be able to compare objects based on more sophisticated, observable features</p> <p>Present data in bar charts</p>



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	Can you use the identification key to find out the name of each of the rocks in your collection?	Prepare own tables to record data Present learning verbally or using labelled diagrams
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CHEMISTRY		PROGRESSION – STATES OF MATTER
PRIOR LEARNING	<p>KS1: Distinguish between an object and the material from which it is made.</p> <ul style="list-style-type: none">• 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 based on their simple physical properties.• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	
Year 4 	<p>Declarative Knowledge</p> <ul style="list-style-type: none">• Materials can be divided into solids, liquids and gases• Solids, liquids and gases are described by observable properties.• Solids are materials that keep their shape unless a force is applied to them. They can be hard, soft or even squashy. Solids take up the same amount of space no matter what has happened to them.• Liquids take the shape of their container. They can change shape but do not change the amount of space they take up. They can flow or be poured.• Gases can spread out to completely fill the container or room they are in. They do not have any fixed shape but they do have a mass.• All material is made of particles – changing the temperature changes the movement of the particles• Materials change state when they are heated or cooled (°C)• Heating causes solids to melt into liquids and liquids evaporate into gases.	



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	<ul style="list-style-type: none"> • Cooling causes gases to condense into liquids and liquids to freeze into solids • The temperature at which given substances change state are always the same. • Evaporation occurs when water turns in to water vapour • Condensation is where water vapour cools down and turns in to water. • Evaporation and condensation occur in the water cycle 	
	<p>Vocabulary Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection</p>	<p>ASSESSMENT: Where do ice cubes go when they disappear? Why does it rain and hail?</p>
<p>End Point</p> <p>Milestone 2</p>	<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 the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 	
<p>Future Learning</p>	<p>Y5: Compare and group together everyday materials based on their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</p> <ul style="list-style-type: none"> • 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 uses of everyday materials, including wood, metals 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 this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda. 	



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WORKING SCIENTIFICALLY STATES OF MATTER		
	Investigations	NC Strands
Year 4	<p>Identify, Classify & Group Can you group these materials and objects into solids, liquids, and gases? How would you sort these objects/materials based on their temperature?</p> <p>Comparative & Fair Test How does the mass of a block of ice affect how long it takes to melt? How does the surface area of water affect how long it takes to evaporate? Does seawater evaporate faster than fresh water?</p>	<p>Independently ask a range of relevant questions that will provide 'useful' results linked to a topic. Think of more than one variable factor. Be able to put appropriate headings onto Carroll diagrams Make systematic and careful observations Decide what data to collect to identify naturally occurring patterns and relationships Choose what to measure or observe Set up simple practical enquiries, comparative and fair tests. 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 Use notes, simple tables and standard units to present results Look for changes, patterns, similarities and differences in their data in order to identify new questions arising from the data, make new predictions. Say what was found out linking cause to effect</p>