



ST JAMES
C.E. PRIMARY SCHOOL

DREAM • BELIEVE • LEARN • ACHIEVE

Science Overview

All Years

Cycle A	Autumn		Spring		Summer
KS1	Seasonal Changes (Autumn and Winter)	Everyday materials	Animals Including Humans (Long unit)	Seasonal Changes (Spring and Summer)	Plants
LKS2	Rocks	Animals including Humans	Light	Forces and Magnets	Plants
UKS2	Light	Animals including Humans	Evolution and Inheritance	Electricity	Living things and their habitats
Cycle B	Autumn		Spring		Summer
KS1	All living things and their habitats	Uses of Everyday Materials	Animals Including Humans		Plants
LKS2	Animals including Humans	States of Matter	Electricity	Sound	Living things and their habitats
UKS2	Earth and Space	Living things and their habitats	Properties and changes of materials	Forces	Animals, including humans

New Science Curriculum - UKS2 - Cycle A (Y6 Objectives)

UKS2 WS Vocabulary	Working Scientifically (WS)	Ways of Working Scientifically
Physics Biology Chemistry Variable Precision 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 • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments. <p>Non-Statutory</p> <ul style="list-style-type: none"> • Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. • They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. • They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. • They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. 	<ul style="list-style-type: none"> • Observing changes over time • Looking for naturally occurring patterns or relationships • Identifying, classifying and grouping • Researching using secondary sources • Comparative and fair testing • Making things and developing systems • Investigating models

- They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.

These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.

Vocabulary	Light		WS - Investigations and Skills
<p><u>Tier 2</u> Travel Source</p> <p><u>Tier 3</u> Light Reflect Eye Shadow Mirror Rainbow</p> <p><u>Additional</u> Man-made Natural Transparent Opaque Lens Angle Primary Secondary</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> I can 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 (1) I can 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 (2) I can use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. (3 and 4) <p>Non-Statutory</p> <ul style="list-style-type: none"> Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur). 	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <p>1. Understand light travels in straight lines and that light is reflected</p> <p>Light travels in waves Straight lines light travels in are often called rays or beams.</p> <p>2. Explain how we use our eyes to see We need light to see things Light travels from a source and reflects off the object to our eye We use our eyes to see We need light to see</p> <p>3. Explain how shadows form Shadows are created when an object blocks the light source Shadows are the same shape as the object blocking the light Shadows can change size depending on the position of the source.</p> <p>4. Compare materials of different transparencies Explore opaque, translucent and transparent objects Opaque objects create the darkest shadow</p> <p>5. Explore and describe how lenses can be used and explore water lenses Light bends as it passes from water to air (refraction)</p> <p>6. Investigate light colour mixing When light passes through a prism it separates into the colours of the rainbow Correct colours of the rainbow (ROYGBIV) Visible light is all the colours together</p>	<ul style="list-style-type: none"> Question - Ask/answer questions Testing and Observation - How light travels Observation - puppets Exploration - puppet shows, light box, prisms and light through water. Turning lights on and off and the effect on our eyes. Investigating Models - Periscope and shadow puppet show. <p>Links to Writing</p> <ul style="list-style-type: none"> Playscript - shadow puppet show to explain how shadows appear Diary of a shadow
Scientists			Links to Maths
Arthur Wilson			<ul style="list-style-type: none"> Shape - language related to shape e.g. straight, bend. Tables to present findings Measurement - distance

Vocabulary	Animals, Including Humans		WS - Investigations and Skills
<p><u>Tier 2</u> System Function</p> <p><u>Tier 3</u> Circulate Diet Exercise Drug Lifestyle Nutrients</p> <p><u>Additional</u> Transported Heart Blood vessels Blood Artery Vein Capillary Pulse Organ</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> I can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (1) I can describe the ways in which nutrients and water are transported within animals, including humans. (2) I can recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function (3-6) <p>Non-Statutory</p> <ul style="list-style-type: none"> Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Pupils should learn how to keep their bodies healthy and how their bodies might be damaged - including how some drugs and other substances can be harmful to the human body. Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health. 	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <ol style="list-style-type: none"> Identify and name the parts of the circulatory system and their functions The circulatory system includes the heart, veins, arteries and blood The heart pumps blood around the body. Arteries carry oxygenated blood away. Veins carry de-oxygenated blood towards. Capillaries are where the exchange of water, nutrients, oxygen and carbon dioxide takes place. Describe how your heart moves blood around the body and why Gas exchange takes place in the lungs (alveoli) Nutrients and water pass through the small intestine (villi) and are absorbed into the blood. The blood transports gases, nutrients and waste products around the body. Describe what affects your heart rate Regular exercise: strengthens muscles/bones; improves circulation; increase oxygen around the body; releases brain chemicals to help you feel calm and relaxed and helps you sleep more easily. Understand a healthy diet involves eating a balance of all nutrients Different food groups and their uses (carbohydrates, fruits and vegetables, minerals and vitamins, fats and oils, dairy and protein.) Understand the negative effects of alcohol, smoking and some drugs. Not all drugs have a negative impact as some are used as medicines. Research the relationship between diet, exercise, drugs, lifestyle and health. 	<ul style="list-style-type: none"> Question - Ask/answer questions Identify - parts of the circulatory system Investigating models comparative and Fair testing - related to exercise or diet Research - secondary sources Classifying - types of drugs/food Present data
			Links to Writing
			<ul style="list-style-type: none"> Narrative - journey of a red blood cell around the circulatory system. Advert not to do unhealthy things e.g. smoke, drink, take drugs
Scientists			Links to Maths
<p>-Marie Maynard Daly -Alexander Fleming -Daniel Hale Williams</p>			<ul style="list-style-type: none"> Finding statistical data from research Tables/charts Classifying and sorting - Venn and Carroll Diagrams.

Vocabulary	Evolution and Inheritance		WS - Investigations and Skills
<p><u>Tier 2</u> Characteristics Variation</p> <p><u>Tier 3</u> Evolution Inheritance Fossil Offspring Identical Breed</p> <p><u>Additional</u> Generation Ancestor Extinct Species Prehistoric Palaeontologist</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> I can recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago (1) I can identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (2 and 3) I can recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents (4) <p>Non-Statutory</p> <ul style="list-style-type: none"> Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, Labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. Note: At this stage, pupils are not expected to understand how genes and chromosomes work. Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. 	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <p>1. Recognise what fossils are and what they tell us</p> <p>Know the simple processes of fossilisation. Know that fossils are the preserved remains, partial remains or traces of ancient animals and plants. Fossils help scientists to learn about the past Fossils prove things change over time</p> <p>2. Understand animals and plants adapt to suit their environment which may lead to evolution</p> <p>Evolution is a gradual process where plants and animals develop over many years</p> <p>3. Research Charles Darwin Animals develop to suit the environment they live in. The process of natural selection.</p> <p>4. Offspring inherit characteristics and traits from their parents and how they vary from the parents. Animals can look different to the parents</p> <p>5. Research issues with adaptation and evolution Animals can be bred for a specific purpose Genetic modification</p>	<ul style="list-style-type: none"> Question - Ask/answer questions Observe - local animals and own family traits/differences Research - secondary sources Exploration - Process of how fossils are made Identify - offspring and parents <p>Links to Writing</p> <ul style="list-style-type: none"> Non-chronological report - different fossil types and what they have taught scientists Newspaper report - finding of a new fossil
<p>Scientists</p> <ul style="list-style-type: none"> -Charles Darwin -Gregor Mendel -Mary Leakey -Dr Lisa White 		<p>Links to Maths</p> <ul style="list-style-type: none"> Sorting Tables to present 	

	<ul style="list-style-type: none">• They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.		
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Vocabulary	Electricity		WS - Investigations and Skills
<p><u>Tier 2</u> Material Measure</p> <p><u>Tier 3</u> Component Battery Symbol Circuit Insulator Conductor</p> <p><u>Additional</u> Wire Buzzer Bulb Motor Switch Electric Voltage Rechargeable</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> I can associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit (1) I can 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 (2) I can use recognised symbols when representing a simple circuit in a diagram. <p>Non-Statutory</p> <ul style="list-style-type: none"> Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. Note: Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity. Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit. 	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <ol style="list-style-type: none"> Explore simple circuits with different voltage of cells Construct a simple circuit and know the names of each part (bulb/buzzer, cell, battery, wires, switch) Understand safety precautions related to electricity Understand different batteries have different voltages Explore how components function Brightness of bulbs and loudness of buzzers can be changed Effect of a switch Use symbols to draw circuits Revisit learning on electrical conductors and insulators Know that most metals are good conductors Create an electrical model using the knowledge they have gained 	<ul style="list-style-type: none"> Question - Ask/answer questions Exploration - use of electrical equipment Comparative and fair testing - brightness of a lamp Investigating models - creating their own model e.g. an alarm/ buzzer game/ traffic lights <p>Links to Writing</p> <ul style="list-style-type: none"> Balanced argument - use of different energy types. Non-chronological report - explain different energy types
<p>Scientists</p> <p>-William Sturgeon -Maria Telkes -Benjamin Franklin</p>			<p>Links to Maths</p> <ul style="list-style-type: none"> Symbols and diagrams Tables to record/present findings Shape and direction - circuits and the flow of electricity

Vocabulary	Living Things and Their Habitats		WS - Investigations and Skills
<p><u>Tier 2</u> Characteristic System</p> <p><u>Tier 3</u> Microorganism Animal Invertebrate Vertebrate Classification Environment</p> <p><u>Additional</u> Plant Classify Fungus Excretion MRS GREN Bird Mammal Fish Reptile Amphibian Microscopic</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> I can 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 (1-4) I can give reasons for classifying plants and animals based on specific characteristics. (5) <p>Non-Statutory</p> <ul style="list-style-type: none"> Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system. 	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <ol style="list-style-type: none"> Describe how living things are classified into broad groups <p>Understand they are groups based on similarities and differences</p> <p>Know that we group plants, animals and microorganisms</p> <p>Identify vertebrate and invertebrate</p> <p>Identify animal groups: mammals, amphibians, reptiles, birds and fish</p> <ol style="list-style-type: none"> Classify broad groups further and understand subdivisions <p>Identify different animal groups</p> <p>Understand there are different groups for invertebrates insect, crustacean, arachnid and mollusc</p> <p>Microorganisms Include bacteria, viruses, and many protists or protozoa</p> <ol style="list-style-type: none"> Research the work of Carl Linnaeus Classify plants and animals into different groups using knowledge from previous lessons including exploring unfamiliar animals <p>Use classification systems</p> <ol style="list-style-type: none"> Explain why we group living things and why they are placed in one group and not another 	<ul style="list-style-type: none"> Question - Ask/answer questions Classify through observation where possible - Animals into different groups Identify - characteristics Research - secondary sources <p>Links to Writing</p> <ul style="list-style-type: none"> Life Processes - Write a poem cinquain to describe the life process of a plant or animal Newspaper Report - How a life process has changed or a new creature has come to affect food chains/life process
<p>Scientists</p> <p>-Antoine Lavoisier -Joseph Priestley -Carl Linnaeus -Libbie Hyman</p>			<p>Links to Maths</p> <ul style="list-style-type: none"> Sorting - using keys and classification systems Tables to present findings