

Oak Year A Autumn 1	Prior Knowledge	Knowledge to be explicitly taught	How the knowledge will be built on
Substantive Knowledge	The children have not looked at evolution before but they have looked at how babies change into adults in humans and other animals.	Plan different types of scientific enquiries to answer their own or others' questions. Group and classify things and recognise patterns using appropriate ways of presenting e.g. creating own classification keys.	Inheritance, chromosomes, DNA and genes <input type="checkbox"/> heredity as the process by which genetic information is transmitted from one generation to the next <input type="checkbox"/> 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 <input type="checkbox"/> differences between species <input type="checkbox"/> the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation <input type="checkbox"/> the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection <input type="checkbox"/> 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 <input type="checkbox"/> the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.
Disciplinary Knowledge		Evolution (Year 6) Artic fox - Darwin and Wallace Different breeds of ? <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. 	
VOCAB	Adaptation, evolution, characteristic, reproduction, genetics, survival		
Learning Objective	<ol style="list-style-type: none"> 1. To recognise that living things have changed over time 2. To know that fossils provide information about living things that inhabited the Earth millions of years ago (3. To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents 4. To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution (<i>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, penguins and camels.</i>) 5. To investigate artic foxes 6. To investigate different finches <p>They might analyse the advantages and disadvantages of specific adaptations, such as being on 2 feet rather than 4, having a long or a short beak, having gills or lungs.</p>		

Oak Year A Autumn 2	Prior Knowledge	Knowledge to be explicitly taught	How the knowledge will be built on
Substantive Knowledge	Light year 3 inc seasonal change in day length <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 changes. 	Know what variables are in a given enquiry and can isolate each one when investigating. Set up a fair test when needed e.g. Does light travel in straight lines? Know how to set up an enquiry based investigation e.g. What is the relationship between the size of the battery and brightness of bulb/ loudness of buzzer To make precise predictions including scientific knowledge e.g. the shadow length is increasing by 2cm each time so at 10cm the shadow will be ___cm long. Plan different types of scientific enquiries to answer their own or others' questions. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Record data and results of increasing complexity using scientific diagrams, classification keys and labels, tables, bar and line graphs Report and present 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 Use results to draw conclusions. Is evaluative when explaining findings from scientific enquiries and is clear about what has happened in recent enquiries and can relate this to other enquiries where appropriate Identify scientific evidence that has been used to support or refute ideas or arguments	In KS3: Light waves <ul style="list-style-type: none"> <input type="checkbox"/> the similarities and differences between light waves and waves in matter <input type="checkbox"/> light waves travelling through a vacuum; speed of light <input type="checkbox"/> the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface <input type="checkbox"/> use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye <input type="checkbox"/> light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras <input type="checkbox"/> colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection
Disciplinary Knowledge		Light Learning leading to making a periscope (year 6) <ul style="list-style-type: none"> • Recognise that light appears to travel in straight lines • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them 	
VOCAB		Refraction, reflection, spectrum, rainbow	
Learning Objective	<ol style="list-style-type: none"> 1. To know the direction that light travels 2. To explain how objects are seen (<i>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</i>) 3. To explain how objects are seen (<i>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</i>) 4. To explain how objects are seen (<i>Deciding where to place rear-view mirrors on cars; and using the idea that light appears to travel in straight lines to explain how it works.</i>) 5. To understand the shapes of shadows (<i>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</i>) 		

	<p>6. To 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, colours on soap bubbles, and coloured filters (they do not need to explain why these phenomena occur).</p>		
Oak Year A Spring 1 and 2	Prior Knowledge	Knowledge to be explicitly taught	How the knowledge will be built on
Substantive Knowledge	<p>Electricity in Sycamore:</p> <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. 	<p>Know what variables are in a given enquiry and can isolate each one when investigating. Set up a fair test when needed e.g. Does light travel in straight lines? Know how to set up an enquiry based investigation e.g. What is the relationship between the size of the battery and brightness of bulb/ loudness of buzzer To make precise predictions including scientific knowledge e.g. the shadow length is increasing by 2cm each time so at 10cm the shadow will be ___cm long. Plan different types of scientific enquiries to answer their own or others' questions. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Record data and results of increasing complexity using scientific diagrams, classification keys and labels, tables, bar and line graphs Report and present 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 Use results to draw conclusions. Is evaluative when explaining findings from scientific enquiries and is clear about what has happened in recent enquiries and can relate this to other enquiries where appropriate Identify scientific evidence that has been used to support or refute ideas or arguments</p>	<p>In KS3: Current electricity ☑ electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge ☑ potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current ☑ differences in resistance between conducting and insulating components (quantitative).</p>
Disciplinary Knowledge		<p>SC1 focused on electricity using light bulbs (Year 6) Make traffic lights</p> <ul style="list-style-type: none"> Associate the brightness of a lamp 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, and the on/off position of switches Use recognised symbols when representing a simple circuit in a diagram. 	
VOCAB		Circuit, series, parallel voltage, volts, amps	
Learning Objective	<ol style="list-style-type: none"> To know how to increase the brightness of a bulb To Compare and give reasons for variations in how components function (the brightness of the bulb) To Compare and give reasons for variations in how components function (the on/off position of switches) To use recognised symbols when representing a simple circuit diagram To design a traffic light system 		

	6. To make a traffic light system
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Oak Year A Summer 1	Prior Knowledge	Knowledge to be explicitly taught	How the knowledge will be built on
Substantive Knowledge	In Sycamore: • Describe the changes as humans develop to old age.	Plan different types of scientific enquiries to answer their own or others' questions. Group and classify things and recognise patterns using appropriate ways of presenting e.g. creating own classification keys.	In KS3: Gas exchange systems ☐ the structure and functions of the gas exchange system in humans, including adaptations to function ☐ the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume ☐ the impact of exercise, asthma and smoking on the human gas exchange system ☐ the role of leaf stomata in gas exchange in plants
Disciplinary Knowledge		Animals inc humans circulatory system ext exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health. (Year 6) • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • Describe the ways in which nutrients and water are transported within animals, including humans	
VOCAB		Circulatory system, heart, valve, blood vessel, vein, artery transport, oxygenated, deoxygenated lifestyle, drug	
Learning Objective	1. To identify and name the main parts of the human circulatory system 2. To describe the functions of the heart 3. To describe the functions of blood vessels and blood 4. To recognise the impact of diet and exercise on the way their bodies function 5. To recognise the impact of drugs and lifestyle on the way their bodies function 6. To describe the ways in which nutrients and water are transported within animals, including humans. ext exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health		

Oak Year A Summer 2	Prior Knowledge	Knowledge to be explicitly taught	How the knowledge will be built on
Substantive Knowledge	In Sycamore: • 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.	Plan different types of scientific enquiries to answer their own or others' questions. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Group and classify things and recognise patterns using appropriate ways of presenting e.g. creating own classification keys.	In KS3: Relationships in an ecosystem <input type="checkbox"/> the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops <input type="checkbox"/> the importance of plant reproduction through insect pollination in human food security <input type="checkbox"/> how organisms affect, and are affected by, their environment, including the accumulation of toxic materials
Disciplinary Knowledge		Living things and their habitats Plants (Year 6) • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics	
VOCAB		Life process, reproduction, offspring, characteristic, classification, organism, micro-organism	
Learning Objective	<ol style="list-style-type: none"> 1. Describe how living things are classified into broad groups 2. To group creatures together 3. To research the Linnaean system of classification 4. To use a classification guide for creatures in our local area 5. To give reasons for classifying plants – <i>create a guide</i> 6. To give reasons for classifying animals 		