

| Oak Year B Autumn 1 | Prior Knowledge | Knowledge to be explicitly taught | How the knowledge will be built on |
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| Substantive Knowledge | In Sycamore: <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. | <ul style="list-style-type: none"> Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 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 | In KS3: Relationships in an ecosystem ♣ the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops ♣ the importance of plant reproduction through insect pollination in human food security ♣ how organisms affect, and are affected by, their environment, including the accumulation of toxic materials |
| Disciplinary Knowledge | | Living things and their habitats – animals (year 6) <ul style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics | |
| VOCAB | | Life process, reproduction, offspring, characteristic, classification, organism, micro-organism | |
| Learning Objective | <ol style="list-style-type: none"> Describe how living things are classified into broad groups (according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals) To group creatures together (for a zoo) To research the Linnaean system of classification To use a classification guide for creatures in our local area To give reasons for classifying plants (<i>create a guide to classify creatures in the forest school</i>) To give reasons for classifying animals (<i>create a guide to classify creatures in the forest school</i>) | | |

| Oak Year B Autumn 2 | Prior Knowledge | Knowledge to be explicitly taught | How the knowledge will be built on |
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| Substantive Knowledge | <p>Light year 3 inc seasonal change in day length</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 | <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 where appropriate • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • 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. • Using test results to make predictions to set up further comparative and fair tests. • Identifying scientific evidence that has been used to support or refute ideas or arguments | <p>In KS3:</p> <ul style="list-style-type: none"> ♣ Light waves ♣ the similarities and differences between light waves and waves in matter ♣ light waves travelling through a vacuum; speed of light ♣ the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface ♣ 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 ♣ light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras ♣ colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection |
| Disciplinary Knowledge | <p>from a light source is blocked by a solid object</p> <ul style="list-style-type: none"> • Find patterns in the way that the size of shadows changes. | <p>Light Learning leading to making a devise to see around corners (Year 6)</p> <ul style="list-style-type: none"> • Recognise that light appears to travel in straight lines • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. | |
| 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>) 6. To investigate the relationship between light sources, objects and shadows (<i>by using shadow puppets.</i>) <p><i>They could extend their experience of light by looking at a range of phenomena including, colours on soap bubbles, and coloured filters (they do not need to explain why these phenomena occur).</i></p> | | |

| Oak Year B Spring 1 | Prior Knowledge | Knowledge to be explicitly taught | How the knowledge will be built on |
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| 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. | <ul style="list-style-type: none"> Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 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 | Inheritance, chromosomes, DNA and genes ♣ 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 ♣ differences between species ♣ the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation ♣ the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection ♣ 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 ♣ the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. |
| Disciplinary Knowledge | | Evolution - How giraffes got longer necks (year 6) Mary Anning- Different breeds of dog <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"> To recognise that living things have changed over time To know that fossils provide information about living things that inhabited the Earth millions of years ago (Mary Anning) To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents 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>) To investigate how giraffes got longer necks To investigate different breeds of dog | | |

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| | 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. |
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| Oak Year B Spring 2 | Prior Knowledge | Knowledge to be explicitly taught | How the knowledge will be built on |
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| Substantive Knowledge | In Sycamore: <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 | <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 where appropriate Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 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. Using test results to make predictions to set up further comparative and fair tests. Identifying scientific evidence that has been used to support or refute ideas or arguments | 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). |
| Disciplinary Knowledge | <ul style="list-style-type: none"> Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors. | Sc1 focused on electricity using buzzers (year 6) Make a burglar alarm <ul style="list-style-type: none"> Associate 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, the loudness of buzzers 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 volume of a buzzer (<i>Systematically identifying the effect of changing one component at a time in a circuit</i>) To Compare and give reasons for variations in how components function (<i>the loudness of buzzers</i>) To Compare and give reasons for variations in how components function (<i>the on/off position of switches</i>) To use recognised symbols when representing a simple circuit diagram To design a burglar alarm To make a burglar alarm |

| Oak Year B Summer 1 | Prior Knowledge | Knowledge to be explicitly taught | How the knowledge will be built on |
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| Substantive Knowledge | They have not looked at this before but they have looked at food and teeth. | <ul style="list-style-type: none"> Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 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 | In KS3: Nutrition and digestion ♣ content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed ♣ calculations of energy requirements in a healthy daily diet ♣ the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases ♣ 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) ♣ the importance of bacteria in the human digestive system ♣ plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots |
| Disciplinary Knowledge | | Brief review of digestive system <ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans | |
| VOCAB | | Oesophagus, stomach, small intestine, large intestine, nutrients, absorb | |
| Learning Objective | <ol style="list-style-type: none"> To know the part of the digestive system To describe the function of the oesophagus in the digestive system To describe the function of the stomach in the digestive system To describe the function of the small intestine in the digestive system To describe the function of the large intestine in the digestive system To describe the digestive system <i>(They might draw and discuss their ideas about the digestive system and compare them with models or images.)</i> | | |

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| Substantive Knowledge | In Sycamore:: • Describe the changes as humans develop to old age. | <ul style="list-style-type: none"> Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 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 | 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) <ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans. | |
| VOCAB | | Circulatory system, heart, valve, blood vessel, vein, artery transport, oxygenated, deoxygenated lifestyle, drug | |
| Learning Objective | <ol style="list-style-type: none"> To identify and name the main parts of the human circulatory system To describe the functions of the heart To describe the functions of blood vessels and blood To recognise the impact of diet and exercise on the way their bodies function To recognise the impact of drugs and lifestyle on the way their bodies function 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 |

