

## St. Mary's Science Department Topic Overview Sheet

<b>Topic:</b>	Evolution and Inheritance	<b>Year Group:</b>	6
<b>Time:</b>	Approx 6 weeks (12 lessons)		

<b>Big Question:</b>	Is there a link between the characteristics that living things inherit from their parents, and how organisms evolve?
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<b>Pupils should arrive at the unit already knowing:</b>	In year 4, pupils would have studied Living things and their habitats, so should know that living things can be grouped in a variety of ways. They should have experience of using classification keys, and have identified and named living things in their local and wider environment. They will have seen how environments can change and that this impacts on living things. In year 5 they will have described the differences in the life cycles of mammals, amphibians, insects and birds. They will be familiar with reproduction in some plants and animals.
<b>During this unit pupils will need to learn:</b>	<ul style="list-style-type: none"> <li>-Recognise that living things have changed over time and that fossils provide information about living things that lived on earth millions of years ago.</li> <li>-Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</li> <li>-Identify how plants and animals are adapted to suit different environments, and how adaptation may lead to evolution.</li> </ul>
<b>This unit links to the following future learning:</b>	This leads directly into Living things and Their habitats unit, where living things are classified according to observable characteristics including micro-organisms, plants and animals. In KS3, pupils will study inheritance in terms of DNA, Chromosomes and genes. They will also study the structure of living things.

<b>During this unit pupils will have the following key experiences:</b>	<b>During the unit pupils will use the following key vocabulary:</b>
<ul style="list-style-type: none"> <li>● Identify examples of inherited characteristics that mean variation in offspring. <span style="color: purple;">-Pupils do not need to understand how genes and chromosomes work.</span></li> <li>● Research the work of palaeontologists such as Mary Anning and how Charles Darwin and Alfred Wallace developed their ideas about evolution.</li> <li>● Review fossil records that show how living things have changed over millions of years. Is there a link between the dinosaurs and the birds?</li> <li>● Use dog breeds to illustrate how offspring are the same kind as their parents, but vary and are different from their parents.</li> <li>● Study examples of animals and plants that are adapted to suit their environment, and adaptation may lead to evolution. Examples could be the insulating fur on an Arctic Fox, Giraffe necks, Darwin's finches.</li> <li>● For home learning, pupils could find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution as a research project during the time taken for the topic.</li> </ul>	Characteristics Inheritance Adaptation Names of various living things Evolution

<b>Working scientifically skills in this unit:</b>	-Using scientific diagrams and labels, reviewing research evidence from palaeontologists and how it has been used to support or refute the ideas about evolution.
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<b>The literacy links for this unit will be:</b>	<ul style="list-style-type: none"> <li>-Reading for understanding and research.</li> <li>- Extended writing opportunities as a response to research of palaeontologists, and adaptations of living things.</li> </ul>	<b>The numeracy links for this unit will be:</b>	How do palaeontologists collect evidence and present data?
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## St. Mary's Science Department Topic Overview Sheet

<b>Topic:</b>	Classification of Living Things	<b>Year Group:</b>	6
<b>Time:</b>	Approx 5 weeks (10 lessons)		

<b>Big Question:</b>	<b>How do scientists classify living things?</b>
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<b>Pupils should arrive at the unit already knowing:</b>	<p>In year 4, pupils would have studied Living things and their habitats, so should know that living things can be grouped in a variety of ways. They should have experience of using classification keys, and have identified and named living things in their local and wider environment. They will have seen how environments can change and that this impacts on living things. -Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>In year 6 pupils will have seen how plants and animals are adapted to suit different environments, and how adaptation may lead to evolution, and living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p>
<b>During this unit pupils will need to learn:</b>	<p>How to describe how living things are classified according to observable characteristics, and based on similarities and differences. To include micro-organisms, plants and animals.</p> <p>To give reasons for classifying plants and animals based on SPECIFIC characteristics.</p>
<b>This unit links to the following future learning:</b>	<p>During KS3, pupils will study Interactions and interdependence, as well as Ecosystem processes. During the Cells topic, they will use a microscope to investigate the organelles in a cell, and identify single cell organisms such as the Amoeba and Euglena.</p>

<p>During this unit pupils will have the following key experiences:</p>	<p>During the unit pupils will use the following key vocabulary:</p>
<ul style="list-style-type: none"> <li>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences.</li> <li>Give reasons for classifying plants and animals based on specific characteristics</li> <li>Identifying harmful and non-harmful microorganisms.</li> <li>Identify and classify common microorganisms</li> <li>For home learning, pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification as a project over the duration of the topic. On Twinkl, this is covered in lesson 2, but becomes obsolete if done as a project.</li> </ul>	<p>Classification Microorganisms Mould Virus Yeast Mammals Arachnids Insects Molluscs Amphibians Reptiles</p>

<b>Working scientifically skills in this unit:</b>	Using classification systems and keys to identify some animals and plants in the immediate environment. Research unfamiliar animals and plants from a broad range of other habitats, and decide where they belong in the classification system.
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<b>The literacy links for this unit will be:</b>	Link with writing push "Bird's Diary"	<b>The numeracy links for this unit will be:</b>	Reference to comparative size of microorganisms. Ordering and reasoning.
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## St. Mary's Science Department Topic Overview Sheet

<b>Topic:</b>	Light	<b>Year Group:</b>	6
<b>Time:</b>	Approx 6 weeks (12 lessons)		

<b>Big Question:</b>	<b>How does light determine how we see the world?</b>
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Pupils should arrive at the unit already knowing:	In Year 3, pupils recognised that they need light in order to see things, and that dark is the absence of light. They noticed that light is reflected from surfaces. They recognised that light from the sun can be dangerous and that there are ways to protect their eyes. They also recognised that shadows are formed when the light from a light source is blocked by an opaque object. They found patterns in the way that the size of shadows change.
During this unit pupils will need to learn:	That light appears to travel in straight lines and they will use this idea to explain that objects are seen because they give out or reflect light into the eye. They will 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 and use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
This unit links to the following future learning:	In Year 7, pupils study waves including light where they identify the similarities and differences between light waves and waves in matter. They also study light waves travelling through a vacuum; speed of light; the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. They will 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; differential colour effects in absorption and diffuse reflection.

During this unit pupils will have the following key experiences:	During the unit pupils will use the following key vocabulary:
<ul style="list-style-type: none"> <li>● Explain that light travels in straight lines from light sources to our eyes, and from light sources to objects and then to our eyes.</li> <li>● Explain how light is reflected. Measure the angles of incidence and reflection.</li> <li>● Create a working periscope and explain how the periscope allows us to see objects we would not usually be able to see.</li> <li>● Know how light is can be bent. Investigate the effects of bending light. Know examples of the direction of light can be altered. <i>(It is NOT necessary for pupils to understand how REFRACTION works at this stage as outlined by Twinkl. REFRACTION should only be used as an independent learning task for stage 4/5 students if appropriate)</i></li> <li>● Know that a prism affects a ray of light. Describe what Isaac Newton discovered about light. Make a colour wheel and describe what it shows about light. <i>(It is NOT necessary for pupils to understand how the spectrum of light works at this stage. Explanation of the spectrum of light should only be used as an independent learning task for stage 4/5 students if appropriate)</i></li> <li>● Describe how a shadow is formed. Explain why shadows are the same shape as the object that casts them. Use knowledge of Isaac Newton's ideas about light to create a shadow puppet play. <i>(The success criteria has been adapted to fit the curriculum on the presentation in the 3rd column, so again, this is preferable to the Twinkl document)</i></li> </ul>	Light sources Angles of incidence and reflection Periscope Prism

<b>Working scientific skills in this unit:</b>	Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; making a periscope and using the idea that light appears to travel in straight lines to explain how it works. 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 <i>(they do not need to explain why these phenomena occur)</i> .
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## St. Mary's Science Department Topic Overview Sheet

<b>Topic:</b>	Humans as organisms	<b>Year Group:</b>	6
<b>Time:</b>	6 weeks (12 lessons)		

<b>Big Question:</b>	Why does the body need its own Transport system?
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<p>Pupils should arrive at the unit already knowing:</p>	<p>In Year 4, pupils described the simple functions of the basic parts of the digestive system in humans. They identified the different types of teeth in humans and their simple functions and constructed and interpreted a variety of food chains, identifying producers, predators and prey.</p> <p>In Year 5, pupils described the changes as humans develop to old age. They should have drawn a timeline to indicate stages in the growth and development of humans. They should have learnt about the changes experienced in puberty.</p>
<p>During this unit pupils will need to learn:</p>	<p>To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. To describe the ways in which nutrients and water are transported within animals, including humans. 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</p>
<p>This unit links to the following future learning:</p>	<p>In Year 7, pupils will look in greater depth at the organisation of the human body. They will see the content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed. They will see calculations of energy requirements in a healthy daily diet and the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. They will learn 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). They will study the structure and functions of the gas exchange system in humans, including adaptations to function and the impact of exercise, asthma and smoking on the human gas exchange system.</p>

<p>During this unit pupils will have the following key experiences:</p>	<p>During the unit pupils will use the following key vocabulary:</p>
<ul style="list-style-type: none"> <li>● Identify and name the parts of the Human Circulatory System. <i>(Although it is great to stretch pupils knowledge by introducing them to the named parts of the Heart and lungs, the priority is for them to know what makes up the Circulatory System, not necessarily the intricate detail of the heart itself)</i></li> <li>● Describe the functions of the main parts of the circulatory system.</li> <li>● Describe how water and nutrients are transported within the body.</li> <li>● Identify what a healthy lifestyle consists of, and describe the impact of diet and exercise on the human body.</li> <li>● Plan a scientific enquiry into the effects of exercise on the body, and record, report and present results appropriately.</li> <li>● Describe the impact of drugs and alcohol on the body, and how scientific evidence highlighted the dangers of smoking.</li> </ul>	<p>Circulatory System Heart Blood vessels and blood. Diaphragm Trachea Bronchus Air sacs (alveoli) Bronchiole</p>

<p>Working scientifically skills in this unit:</p>	<p>Carry out an investigation into the effects of exercise on the body. Record and draw conclusions from the results of the investigation. Exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health</p>
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## St. Mary's Science Department Topic Overview Sheet

<b>Topic:</b>	Electricity	<b>Year Group:</b>	6
<b>Time:</b>	7 weeks (14 lessons)		

<b>Big Question:</b>	<b>How does an electric circuit work?</b>
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Pupils should arrive at the unit already knowing:	In Year 4, pupils identified common appliances that run on electricity and constructed a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. They identified 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. They recognised that a switch opens and closes a circuit and associated this with whether or not a lamp lights in a simple series circuit. They recognised some common conductors and insulators, and associated metals with being good conductors. In Year 5, during the Properties and changes of Materials topic, pupils compared the electrical conductivity of everyday materials.
During this unit pupils will need to learn:	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. 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. <span style="color: purple;">It is not part of the curriculum for pupils to look at parallel circuits at this stage.</span>
This unit links to the following future learning:	In Year 8, pupils will see electric current measured in amperes, in series and <b>parallel</b> circuits. 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)

During this unit pupils will have the following key experiences:	During the unit pupils will use the following key vocabulary:
<ul style="list-style-type: none"> <li>● It's electrifying. Review of previous learning of electricity by looking at the changes over time.</li> <li>● Recognise and draw scientific circuit symbols. Create circuit diagrams using symbols.</li> <li>● Observe and explain the effects of differing voltages in a circuit.</li> </ul>	Circuit Bulb Wire Cell Battery Conductor Insulator Component Incomplete

<b>Working scientifically skills in this unit:</b>	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.
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