

St. Mary's Science Department Topic Overview Sheet

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| Topic: | Investigating Science | Year Group: | 5 |
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| Big Question: | What methods are needed when investigating Science? |
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| Pupils should arrive at the unit already knowing: | Asking relevant questions and setting up simple enquiries. Comparative and fair tests. Making careful observations. Standard units of measurement for example thermometers Presenting data in a variety of ways. Labelling of diagrams, keys, bar charts and tables. Presenting simple conclusions. Identifying similarities/differences or changes related to simple scientific ideas. (This introductory unit should be used to assess how much has been retained from feeder primary schools, and build upon it). |
| During this unit pupils will need to learn: | Taking measurements using a range of scientific equipment with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results using more complex diagrams and labels, tables, scatter graphs, bar and line graphs. Identifying scientific evidence that has been used to support or refute ideas or arguments. Planning scientific enquiry identifying independent, dependent and control variables. |
| This unit links to the following future learning: | All scientific enquiry in all topic areas. Pupils should gain more independence in data acquisition, presenting data and drawing conclusions. This should be reinforced in investigations throughout the coming 2 years. |

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| 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"> Drawing Scientific diagrams from a range of different practical apparatus set ups. Reading and taking measurements from a carousel of different scientific equipment including thermometers, measuring cylinders, timers, Newton meters and data loggers. Include scientific diagrams of equipment used. Collection and presentation of data using tally charts and tables centred around lobed/fixed ears, arm length and height. Presentation of data as bar charts, pie charts, scatter graphs. Possible use of spreadsheets. Planning an investigation into how exercise affects either breathing rate or pulse rate. This should include predictions. Present data as a line graph. Extended writing of a simple investigation using passive voice to include response to predictions and conclusions, and identifying evidence to support or refute ideas/arguments. | Thermometer Newton meter Volume Data Pie chart Scatter graph Line graph Prediction Conclusion Accuracy Precision Independent variables Dependent variable Control Variables |

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| Working scientifically skills in this unit: | Taking measurements using a range of scientific equipment with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results using more complex diagrams and labels, tables scatter graphs, bar and line graphs. Identifying scientific evidence that has been used to support or refute ideas or arguments. Planning scientific enquiry identifying independent, dependent and control variables. |
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| The literacy links for this unit will be: | Extended writing opportunity for Passive writing and balanced argument. Subject specific terminology | The numeracy links for this unit will be: | Data analysis (see above) Possible use of percentage, fractions and proportion for higher level. |
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Notes:

This is a real opportunity for contextual learning in that data collected as a result of investigation can be used to inform Maths lessons, and the extended writing elements can be delivered in literacy lessons. If each pupil compiles a booklet of data, Maths teachers can use this as context for week 6 and 7 Data handling.

St. Mary's Science Department Topic Overview Sheet

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| Topic: | Living things and their habitats (Life Cycles of a variety of living things) | Year Group: | 5 |
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| Big Question: | Do all living things have the same life cycles? |
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| Pupils should arrive at the unit already knowing: | <p>In Year 2, pupils were taught to explore and compare the differences between things that are living, dead, and things that have never been alive. They identified that most living things live in habitats to which they are suited. They described how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. They identified and named a variety of plants and animals in their habitats, including microhabitats. They described how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identified and named different sources of food.</p> <p>In Year 4 pupils recognised that living things can be grouped in a variety of ways explored and used classification keys to help group, identify and name a variety of living things in their local and wider environment. They recognised that environments can change and that this can sometimes pose dangers to living things.</p> |
| During this unit pupils will need to learn: | <p>Pupils will describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. They will describe the life process of reproduction in some plants and animals. Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. This may be referred to throughout the year.</p> |
| This unit links to the following future learning: | <p>In Year 6, pupils describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. They will give reasons for classifying plants and animals based on specific characteristics. This will also link to the unit of Evolution and Inheritance.</p> |

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| 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"> Describe the difference between Sexual and Asexual reproduction in plants, and name the parts of a flower. (2 lessons) Describe and compare reproduction and the life cycles of mammals. Describe the work of Jane Goodall, and endangered species. Describe and compare the life cycles of amphibians and insects. Describe the life cycle of birds and compare to other animals. <p>Pupils could research David Attenborough for a home learning project over the course of the topic including watching examples of his documentaries.</p> | <p>Mammal Amphibian Insect Bird Reproduction (sexual/asexual) Microorganisms Environment (local) Life Cycles</p> |

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| Working scientifically skills in this unit: | <p>Observing and comparing the life cycles of plants and animals in the local environment with other plants and animals around the world. Asking pertinent questions and suggesting reasons for similarities and differences when comparing local living things to those seen as part of the Rainforests topic from Humanities. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time, comparing how different animals reproduce and grow.</p> |
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| The literacy links for this unit will be: | Could link to "Mythical Beasts in English lessons. Writing methods in comparison to Non chronological reports. | The numeracy links for this unit will be: | Number, measure place value. Possible use of the scale of different living things. (HT Twins Scale of the Universe is an interesting stimulus/hook) |
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St. Mary's Science Department Topic Overview Sheet

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| Topic: | Properties and changes in materials | Year Group: | 5 |
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| Big Question: | Do different materials behave differently? |
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| Pupils should arrive at the unit already knowing: | In year 1 and 2, pupils identified and compared the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. They found out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. In Year 4 they compared and grouped materials together, according to whether they are solids, liquids or gases. They observed that some materials change state when they are heated or cooled, and measured the temperature at which this happens in degrees Celsius (°C). They looked at the part played by evaporation and condensation in the water cycle and should be able to associate the rate of evaporation with temperature. They learnt about magnetism in year 3 and about electricity in year 4. |
| During this unit pupils will need to learn: Pupils should not explore Particle Theory to greater depth, as they will do this in Year 7. It should only be referenced when necessary. | To compare and group together everyday materials on the basis of their properties, including: Hardness Solubility Transparency Conductivity (electrical and thermal) Response to magnets That some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. To show practically how dissolving, mixing and changes of state are reversible changes. To 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 and the action of acid on bicarbonate of soda. |
| This unit links to the following future learning: | In Year 7 pupils examine the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure and changes of state in terms of the particle model as well as density. They will look at Atoms, Elements and Compounds, and compare Carbon in relation to the Reactivity Series in Year 8. They will study conservation of material and of mass, and reversibility in melting, freezing, evaporation, sublimation, condensation and dissolving. |

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| During this unit pupils will have the following key experiences: | During the unit pupils will use the following key vocabulary: |
| <p>At this point, the emphasis is on OBSERVATION, RECORDING and DESCRIBING properties of materials NOT explaining using Particle Theory.</p> <ul style="list-style-type: none"> ● Investigate, observe and compare the properties of a number of different everyday materials. ● Comparison of Thermal Conductors. (At this stage it is not necessary to do a class full investigation into insulating coffee cups or lunch boxes. Time will not allow this, but this is an opportunity for HL independent investigation for WS) ● Ordering materials according to electrical conductivity activity. (It is only necessary to make reference to resistance at this time as it will be covered fully in Year 6) ● Soluble or insoluble investigation. (Pupils to identify variables put in place by the teacher at this stage. When showing/investigating speed of dissolving, you could assign different groups a different variable to investigate. Again, observing what affects the speed of dissolving is focus NOT full investigation/explanation.) ● How to separate mixtures activity. (Emphasis on doing. Where possible, give the equipment that could be used and allow pupils to decide how they should separate the mixtures.) ● Observation and identification of Reversible and Irreversible changes. (Pupils to observe demonstration of examples and categorise them. There is opportunity to set up HL independent investigation at this stage.) | Properties Hardness Solubility Transparency Conductivity Response to magnets |

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| Working scientifically skills in this unit: | At this point, the emphasis is on OBSERVATION, RECORDING and DESCRIBING properties of materials NOT explaining using Particle Theory. Where required, accurate measurements taken. Pupils should identify dependent, independent and control variables and use scientific diagrams to show apparatus used, but do not need to write up experiments as whole investigations. |
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| The literacy links for this unit will be: | Correct use of subject specific terminology in context. Research as home learning activity. | The numeracy links for this unit will be: | Use of tables/charts. Accurate measurement. |
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St. Mary's Science Department Topic Overview Sheet

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| Topic: | Forces | Year Group: | 5 |
| Time: | 5 weeks (10 lessons) | | |

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| Big Question: | What do we mean by Force? |
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| Pupils should arrive at the unit already knowing: | In year 3, pupils compared how things move on different surfaces. They will have noticed that some forces need contact between two objects, but magnetic forces can act at a distance. They observed how magnets attract or repel each other and attract some materials and not others. They will have grouped together a variety of everyday materials on the basis of whether they are attracted to a magnet, and described magnets as having two poles. They should be able to predict whether two magnets will attract or repel each other, depending on which poles are facing. |
| During this unit pupils will need to learn: | To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. To identify the effects of air resistance, water resistance and friction, that act between moving surfaces. To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. |
| This unit links to the following future learning: | In year 7, pupils study forces as pushes or pulls, arising from the interaction between two objects. They will: <ul style="list-style-type: none"> ● use force arrows in diagrams, adding forces in one dimension ● understand balanced and unbalanced forces ● identify moment as the turning effect of a force ● forces associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water forces measured in newtons, measurements of stretch or compression as force is changed ● study non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity In Year 8, pupils calculate the mechanical advantage of levers, pulleys and gears as part of their study of Energy Resources and their effects. |

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| During this unit pupils will have the following key experiences: | During the unit pupils will use the following key vocabulary: |
| <p style="color: purple; font-size: small;">At this stage, it is unnecessary to introduce the topic with "Balanced and Unbalanced Forces"</p> <ul style="list-style-type: none"> ● Introduction to Falling objects relating to Gravity. ● Investigate Falling objects relating to Gravity and air resistance. ● Building a streamlined boat activity. (Water resistance) ● Investigating Friction in moving objects. ● Marvellous mechanisms activity. (Levers, pulleys and gears) Home learning project opportunity to build and improve a falling paper helicopter. Alternatively, pupils could investigate falling sycamore seeds. | Gravity Air resistance Water resistance Friction Mass Weight Newtons Levers Pulleys Gears |

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| The literacy links for this unit will be: | Possible use of Passive Voice for method for one of the experiments. Balanced argument link to Literacy lessons used for conclusions. | The numeracy links for this unit will be: | Problem solving in Numeracy lessons including measurement. Accurate/precise measurements. Recording using tables/charts/graphs |
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St. Mary's Science Department Topic Overview Sheet

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| Topic: | Earth, Sun and Moon | Year Group: | 5 |
| Time: | 5 weeks (10 lessons) | | |

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| Big Question: | Is it important to study study objects in Space, when we spend all our time on Earth? |
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| Pupils should arrive at the unit already knowing: | In year 3 and 4, pupils do not formally study the Earth, Moon and the Sun, but they have learnt about: Rocks and how they can be grouped according to their physical properties; light is reflected from surfaces and dark is the absence of light; the light from Sun can be dangerous, and how to protect themselves from this; that shadows are formed when light is blocked by an opaque object; some aspects of Forces, but mainly contact forces and magnetism. |
| During this unit pupils will need to learn: | <ul style="list-style-type: none"> • How to describe the movement of the Earth and other planets relative to the Sun in the solar System. • How to describe the movement of the Moon relative to the Earth. • How to describe the shape of the Sun, Earth and Moon. • The link between the the earth's rotation and day and night, and the apparent movement of the Sun across the sky. |
| This unit links to the following future learning: | Aspects of the Light topic (Year 6) that light travels in straight lines from light sources, and reflected from objects to our eyes. KS3 Space Physics-The Sun as a star, other stars, the seasons. Living things- Living things affected by the movement of Sun, Earth and Moon. |

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| During this unit pupils will have the following key experiences: | During the unit pupils will use the following key vocabulary: |
| <p>-Use of a model of the Sun and earth to explain night and day.</p> <p>-Role play of the movement of the Moon relative to the Earth, construction of diagrams to reinforce.</p> <p>-Role play of the Sun as a star at the centre of our solar System, learning the eight planets (with Pluto as a dwarf Planet).</p> <p>-Fully understand that it is not safe to look directly at the Sun.</p> <p>-Research of the Scientists Ptolemy, Alhazen and Copernicus.</p> <p>-Possible Home Learning project:-Making a shadow clock/sundial.</p> <p><i>Pupils do not need to learn about seasons at this stage.</i></p> | <p>Mercury</p> <p>Venus</p> <p>Earth</p> <p>Mars</p> <p>Jupiter</p> <p>Saturn</p> <p>Uranus</p> <p>Neptune</p> <p>Pluto</p> <p>Spherical</p> |

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| Working scientifically skills in this unit: | Recording data using scientific diagrams and labels. Reporting and presenting findings from Ptolemy, Alhazen and Copernicus including conclusions. Identifying scientific evidence that has been used to support or refute ideas or arguments. |
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| The literacy links for this unit will be: | Reading for understanding and research. Report writing including passive voice. | The numeracy links for this unit will be: | Comparing values connected with size and distance of planets/stars. Using data. Time in relation to calibrating sundials. Perimeter (being used in Numeracy at this time) Fractions could be included for relative sizes. |
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St. Mary's Science Department Topic Front Sheet

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| Topic: | Animals including humans | Year Group: | 5 |
| Time: | 7 weeks (14 lessons) | | |

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| Big Question: | |
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| <p>Pupils should arrive at the unit already knowing:</p> | <p>In Year 3, pupils identified that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food. They identified that humans and some other animals have skeletons and muscles for support, protection and movement.</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>This links directly with the work on Life Cycles completed previously this year on Life Cycles in "Living things and their Habitats".</p> |
| <p>During this unit pupils will need to learn:</p> | <p>To describe the changes as humans develop to old age. Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.</p> |
| <p>This unit links to the following future learning:</p> | <p>In Year 6, pupils will identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. They will recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. They will describe the ways in which nutrients and water are transported within animals, including humans.</p> |

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| <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"> Describe 6 stages of Human development.(Ordering stages and look at changes occurring at each stage) Use of data regarding growth of babies. <i>(This is useful for data analysis and data presentation rather than the content being necessary for the curriculum)</i> Describe the changes that occur during Puberty giving reasons for these changes, and differences between boys and girls at this stage. Examine the facts and myths in regard to human old age. Compare Gestation periods of different animals to that of Humans. Create line and bar graphs in order to compare data regarding Life Expectancy | <p>Human Development Adolescence Puberty Adulthood Gestation Life Expectancy</p> |

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| <p>Working scientifically skills in this unit:</p> | <p>Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.</p> <p>Data analysis in the form of Bar and Line graphs. Using correct presentation of data.</p> |
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| <p>The literacy links for this unit will be:</p> | <p>Writing in response to presentation of data. Balanced argument. Description.</p> | <p>The numeracy links for this unit will be:</p> | <p>Data analysis in the form of Bar and Line graphs. Using correct presentation of data.</p> |
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| Notes: | |
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