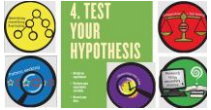




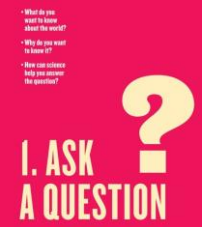


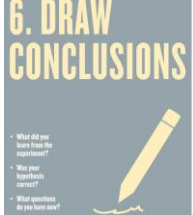
St. Mary's Scientific skills to be taught (progression by Year group)

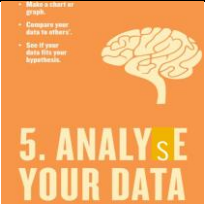
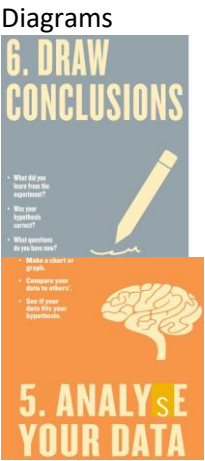

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Practical investigations 	Carry out investigations in a whole lesson following the simple investigation format- Question What do you think might happen? Test What happened?	Design as a class –whole class discussion. Options around apparatus- give opportunities for children to select the right apparatus from selections including red herrings.	Children to suggest and select equipment for investigations- carry out simple investigations by themselves with provided equipment.	Begin to make decisions about where and what to test.	Independently follow written instructions for conducting fair test Choose how to test a given question and what equipment to use.	Using previous science understanding to solve scientific problems. Selecting the right equipment to solve the problem/complete the experiment. Planning independent investigations to answer a question.	Plan an experiment to answer own questions – continuing and building on experiments.
Observations over time 	Describe processes verbally Building descriptions of the world around the children Building vocabulary	Teacher-led Verbal discussion Labelling photographs	Independent observations and drawings Stem sentence to support writing	Note taking from real events/experiments is modelled Using sentence signposts to order events	Note taking independently Technical language used to record Independent written observations	Independent recording Selecting the correct equipment for the job of observing Make decisions about which observations are needed.	Select and choose the correct equipment to make scientific observations over a prolonged investigation Use of accurate scientific language.

						Consider variables. Collect observations in own way from possible suggestions.	Including specific measurements taken.
<p>Fair testing/comparing</p> 	<p>Concept of fairness is introduced through play and social times.</p> <p>Fairness- introduction through other elements of the curriculum RHE, Maths</p> <p>Continuous provision- cars on race track if one nearer bottom Why isn't this okay?</p>	<p>Choral response- It isn't fair!</p> <p>Teacher demonstrates silly ways of completing the test- Why can't I stand this close/ throw from here? Because it isn't fair</p>	<p>Teacher asks Is it fair? each time we complete investigation in year 2 introduce the ideas- what will we keep the same and what are we changing?</p>	<p>Continue with asking how we will make it fair. What will we change and what will stay the same? Discuss with teacher</p> <p>Reflecting afterwards about results- did anything effect the results. Was it a fair test?</p>	<p>Children to include how the test will be fair when they write predictions.</p> <p>Teacher to introduce the word variables when discussing what needs to change and stay the same.</p> <p>When writing conclusions. Children to answer for themselves what will stay the same and what will change?</p>	<p>Children to use the word variables what variables will stay the same and which variables will change?</p>	<p>Selecting the variables that must stay the same and using the word variables.</p>

<p>Classifying and sorting</p> 	<p>Sort concrete objects by different criteria</p>	<p>4+ categories Identify and sort materials by their properties using concrete objects. Record based on practical experience of sorting</p>	<p>Beginning to write ideas under two headings</p>	<p>Introduce the term classification as a scientific skill</p> <p>Choose own ways to sort with more than one category</p> <p>Order more than 2 samples from most to least</p>	<p>Generate own examples to match given criteria-eg: solid, liquid, gas</p> <p>Revisit the term classification.</p>	<p>Applying previous scientific skills to test objects before classifying.</p>	<p>Choose the best way to sort and classify information and data</p>
<p>Using secondary sources/ research</p> 	<p>Use storybooks to support children's understanding Sally and the limpet Jaspers Beanstalk</p>	<p>Use information/images provided by teacher to help find information</p>	<p>Plant Identification mats in pictures Google maps for distances</p>	<p>Sorting/branching identification key for soil</p>	<p>Ear diagrams</p>	<p>Research a specific question: Eg: Which plants are Jovian and terrestrial and present findings independently.</p> <p>Pick a planet to research and present to parents.</p>	<p>Select and choose the best secondary resources to research and back up thinking</p>
<p>Questioning</p> 	<p>Asking questions as a class based on the environment around them.</p>	<p>Sharing a scientific question as a class</p>	<p>Finding answers to questions provided by teachers</p>	<p>Asking questions based on findings</p>	<p>Asking scientific questions</p>	<p>Generate own questions based on research of secondary sources.</p>	<p>Creating and testing hypotheses based on previous science knowledge</p>

						Recognise the type of questions being asked and sort into those that can be tested and those that might need to be researched.	Asking questions based on results- what are the next steps? Where can the science go next?
<p>Predicting</p>	<p>What might happen? Discussion as a part of play and in science style lessons.</p> <p>Discussion and introduction to the word (summer 2)</p>	Whole class discussion and recorded together	Stem sentence in book because introduced	Simple written prediction after discussion	Because I know that.... Adding extra layers of detail- linking to science knowledge from previous learning.	<p>A prediction comes after an experiment making further predictions about other similar investigations which could be completed.</p> <p>Choosing experiments to test and making predictions</p>	<p>Considering the variables and make independent predictions.</p> <p>Making predictions based on what they have found out for future similar investigations. Make predictions about what would happen if a different variable was changed.</p>
Evaluating/Concluding	<p>What did happen? Children to answer the</p>	Introduction of word conclusion Whole class discussion and	Stem sentence in book with word because introduced	A more detailed stem sentence Our investigation	No stem sentence- some modelling but then pupils must	Conclusion is discussed and children write independent	Conclusions are written independently

 <p>6. DRAW CONCLUSIONS</p> <ul style="list-style-type: none"> What did you learn from the experiment? Was your hypothesis correct? What questions do you have now? 	<p>question at the end of a test.</p> <p>After looking at a wow event/change/ event the class teacher will summarise what this means. We have seen which shows us that...</p>	<p>recorded together</p>		<p>showed us that... A possible reason for this is...</p>	<p>write own conclusion.</p> <p>Linking and explaining how experiments can demonstrate and reflect what is happening in everyday life.</p>	<p>conclusion which links to future similar experiments or draws in other science knowledge.</p>	<p>And reflect the success of the experiment and look forward to what could be done next or differently.</p> <p>Begin to look forward to the next logical investigation.</p>
<p>Charts/graphs/recording</p>  <p>5. ANALYSE YOUR DATA</p> <ul style="list-style-type: none"> Compare your data to others. See if your data fits your hypothesis. 	<p>Simple counting /tally/ bar chart led by the teacher</p>	<p>Pictogram/bar chart- axis drawn and labelled Tally charts</p>	<p>Venn diagram Pictogram/bar chart- axis drawn and labelled Independent tally- to lead to bar Bean diary- measurements of length and sketches over time</p>	<p>Bar chart with support for axis Annotating photographs Diagrams to show what happened</p>	<p>Bar chart independent choice of axis/data Carroll diagram (blank for pupils to label) Line graph- to show evaporation over time – modelled for first time – increasing independence over year</p>	<p>Graph with 10cm intervals Line graph- 2 lines representing 2 beakers- key for colours</p>	<p>Line graph</p>
<p>Tables</p>	<p>Any recording is done by teacher</p>	<p>Teacher completes tables for whole class</p>	<p>Table given with just headings for children to</p>	<p>Table given but children with headings</p>	<p>Children choose headings and draw own tables</p>	<p>Independent use of tables to</p>	<p>Make decisions about collecting data in most</p>

	<p>for children to see.</p>		<p>complete-ticks and crosses</p>	<p>children complete with descriptions/data found themselves</p>	<p>with discussion and modelling Select ways to present findings from a choice given by teacher</p>	<p>collect data - design own table</p>	<p>efficient way – independently recording data</p>
	<p>Children to draw simple drawings of what they did.</p>	<p>Draw a simple picture diagram</p>	<p>Label a simple picture diagram using labels provided by teacher</p>	<p>Draw a diagram using a ruler Add in own simple labels based on a model</p>	<p>Draw own diagrams and write own labels</p>	<p>Draw diagrams based on demonstrations in class and apply to scientific events in reality eg: night and day label independently</p>	<p>Write simple explanations to accompany simple accurate diagrams using a ruler Use agreed scientific symbols in diagrams.</p>
<p>Using apparatus: Measuring</p> 	<p>Apparatus provided by teachers and modelled in how to use Independent use in continuous provision</p>	<p>Measuring in cm with metre stick or ruler</p>	<p>Trundle wheel Stop watch Ruler measure length of plants Weight (g) to float or sink materials to choose from</p>	<p>Force meter introduced Measuring equipment</p>	<p>Thermometer readings ml- amounts of water/liquid Data logger</p>	<p>Force – newton meter</p>	<p>Data logger Hear rate monitor</p>

St. Mary's Knowledge progression by year group

	Reception	y1	y2	y3	y4	y5	y6
Animals including humans	Explore the natural world around them,	*Identify and name a variety of common	* know animals including	* Identify that animals need the right types and	*describe the simple functions of the basic	describe the changes as	*identify and name the main parts of the

	making observations and drawing pictures of animals and plants;	animals including fish, amphibians, reptiles, birds and mammals *Identify and name animals that are carnivores, herbivores and omnivores *Describe and compare structure of an animal Identify, name, draw and label basic parts of a human	humans have offspring * find out about the basic needs of an animal for survival Describe importance of exercise, eating, the right amounts of different types of food and hygiene -simple food chain with arrows- arrows show what is being consumed	amount of nutrition, and that they cannot make their own food, they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement *Construct a food chain as a whole class- teacher led Label producer, primary and secondary consumer	parts of the digestive system in humans *identify the different types of teeth in humans and their simple functions Impact of changes to the environment on living things in the environment.	humans develop to old age	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
Plants	Growing plants- as part of the environment	Basic structure of trees and plants	Difference between living and non-living things What they need to grow well	Naming the different parts of a flowering plant Transportation of water and nutrients	Identify living things in ponds/oceans	Reproduction of plants- how they reproduce- revision of parts of plant	

			How seeds and bulbs grown into mature plants Structure and job of parts of tree/plant				
Food chains	Understand where certain foods come from eg; vegetables from above or below ground	Carnivore, omnivore, herbivore vocabulary introduced	Simple food chain introduced	Whole class Food chain with terms producer, consumer included producer, primary consumer, secondary consumer, tertiary consumer	Independently make and Interpret a variety of food chains, identifying producers, primary, secondary, tertiary	Food webs	Independently identify the food chain of an artic animal (frozen Kingdom)
Materials/ states of matter	Recognising changes of state eg: ice	Identifying materials and some of their properties	Properties of materials and their suitability for different purposes Solid liquid	Rocks and their properties Where they are used as materials	States of matter- changes between solid, liquid and gas	-Reversible and irreversible changes -when something new is created it is usually irreversible change -Solids in liquids Liquids into gases Solutions/soluble and insoluble -	

Electricity					<p>What appliances are electric</p> <p>-series circuits-</p> <p>-insulators and conductors</p> <p>-How the switch works? Open and closed switches</p> <p>-Make predictions about whether circuits are successful –Will the lamp light?</p>		<p>Circuit symbols</p> <p>Relationship between number of batteries and bulbs and brightness/buzzer loudness</p> <p>Compare and given reasons for variations in how components function</p>
Forces			<p>-squashing, bending, twisting and stretching materials</p>	<p>-Understand push, pull, how things move on different surfaces</p> <p>-magnetism</p> <p>-Some forces need direct contact</p> <p>-Magnetism does not need direct contact</p>	<p>Consolidation:</p> <p>Force required to fire arrow</p> <p>Relationship between force applied and distance travelled</p>	<p>Understand, draw and label and explain the following forces:</p> <p>-Gravity</p> <p>-Friction</p> <p>-air resistance</p> <p>-water resistance</p> <p>Simple machines:</p> <p>Pulleys, levers, gears</p>	

Classification/							Microorganisms plants and animals can be sub-divided Vertebrates and invertebrates