Our Lady Star of the Sea Science Programme of study (PoS) Year 5

Forces	Light/Astronomy	Materials	Circulatory systems/Animals
Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the object Gravity can act without direct contact between the Earth and an object. Pupils might find out how scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity) which have different effects on objects Identify the effects friction including: air resistance, water resistance that act between moving surfaces (causing things to slow down) The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect. Friction, air resistance and water resistance can be useful or unwanted. More than one force can act on an object simultaneously (either reinforcing or opposing each other). Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	Describe the movement of the Earth, and other planets, relative to the Sun and each other in the solar system. Describe the movement of the Moon relative to the Earth. Describe Sun/Earth/Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night. The Earth spins once around its own axis in 24 hours, giving day and night. The Earth orbits the Sun in one year. We can see the Moon because the Sun's light reflects off it. The Moon orbits the Earth in approximately 28 days and changes to the appearance of the moon are evidence of this. Use the Earth's movement in space to explain the apparent movement of the sun across the sky. The Sun appears to move across the sky from East to West and this causes shadows to change during the day. Changes to shadow length over a day or changes to sunrise and sunset times over a year are evidence supporting the movement of the Earth. Explore how pupils ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. 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 the light that travels from light sources to our eyes or from light sources to objects and then to our eyes (and represent this in simple diagrammatic form). Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	**Irreversible:** 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 (producing a gas / fizzing). Explore changes that are difficult to reverse, for example, burning, rusting and other reactions Find out about how chemists create new materials Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. **Reversible:** Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Demonstrate that dissolving, mixing and changes of state are reversible changes. Changes can occur when different materials are mixed. Some material changes can be reversed and some cannot. Recognise that dissolving is a reversible change. Distinguish between melting and dissolving. Mixtures of solids (of different particle size) can be separated by sieving. Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (un-dissolved). Evaporation helps us separate soluble materials from water. Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind speed). Freezing, melting and boiling changes can be reversed (revision from YR4).	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. The heart is a major organ and is made of muscle. The heart pumps blood around the body through vessels and this can be felt as a pulse. The heart pumps blood through the lungs in order to obtain a supply of oxygen. Blood carries oxygen/essential materials to different parts of the body. During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function (in the long term and short term). Describe the ways in which nutrients and water are transported within animals, including humans. Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/ respire and excrete. An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals). Tobacco, alcohol and other 'drugs' can be harmful. All medicines are drugs, not all drugs are medicines.

Our Lady Star of the Sea SCIENCE KEY SKILLS YEAR 5

	Exploring and observing	Grouping and classifying	Questioning	Research	Modelling	Collaborating
	UKS2 - developing a deeper understanding of a wide range of scientific ideas and encountering more abstract ideas ***LKS2 - developing their own ideas and their understanding of the world around them***	***UKS2 - Compare and contrast a variety of examples linked to UKS2 PoS*** ***LKS2 - Compare and contrast a variety of examples linked to LKS2 PoS***	***UKS2 - asking their own questions about scientific phenomena*** ***LKS2 - asking relevant questions***	***UKS2 – summarise research from a wide variety of sources and recognising that scientific ideas change and develop over time*** ***LKS2 - finding things out using a wide range of secondary sources of information***	***using dance, drama or a visual aid to represent science in the real world***	***interacting effectively as part of a group***
Year 6	Use correct scientific knowledge and understanding and relevant scientific language to discuss their observations and explorations (linked to Y6 PoS) Identify changes that have occurred over a very long period of time (evolution) and discuss how changes have impacted the world Explore more abstract systems / functions / changes / behaviours and record their understanding of these	Recognise the importance of classification to the scientific world and form a conclusion from their sorting and classifying Compare and contrast more complex processes, systems, functions (e.g. sexual and asexual reproduction) Construct a classification key / branching database using more than two items Compare and contrast things beyond their locality and discuss advantages/disadvantages, pros/cons of the similarities and differences Use *research** to identify and classify things Use classification systems, keys and other information records [databases] to help classify or identify things.	Recognise scientific questions that do not yet have definitive answers (linked to Y6 PoS) Refine a scientific question to make it testable i.e. Ask a testable question which includes the change and measure variables - *e.g. what would happen to … if we changed …?* *e.g. What affect would we have on … if we …?* *e.g. How would exercise affect the pulse rate?* Use observations to suggest a further (testable or research) question. Independently ask a variety of scientific questions and decide the type of enquiry needed to answer them	Research how scientific ideas have developed over time and had an impact on our lives. Use evidence from a variety of sources to justify their ideas Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. Interview people to find out information	Make / perform and use their own versions of simple models to describe and explain scientific ideas (e.g. circulatory system drama, periscopes to explain how light travels, burglar alarm to explain components in a circuit)	Propose their own ideas and make decisions with agreement in a group Support, listen to and acknowledge others in the group Check the clarity of each other's suggestions Build on / add to someone else's idea to improve a plan or suggestion Understand that it is okay to disagree with their peers and offer a reasons for their opinion
Year 5	Use their developing scientific knowledge and understanding and relevant scientific language and terminology to discuss, communicate and explain their observations (incl. more abstract ideas from Y5 PoS (e.g. friction, air resistance, forces, Earth and space, reversible and irreversible changes). Evaluate their observations and suggest a further test, offer another question or make a **prediction** Observe (including changes over time) and suggest a reason for what they notice	Suggest reasons for similarities and differences Compare and contrast things beyond their locality and use these similarities and differences to help to classify *(melting compared with dissolving, etc).* Use secondary sources of information to identify and classify. Decide which sources of information (and/or equipment and/or test) to help identify and classify	Recognise scientific questions that do not yet have definitive answers. (linked to Y5 PoS) Refine a scientific question so that it can be tested e.g. 'What would happen to… if we changed…?' Decide whether their questions can be answered by researching or by testing Independently ask their own scientific questions taking some ownership for finding out the answers	Find out how scientific ideas have changed/ developed over time (linked to Y5 PoS) Articulate and explain findings from their research using scientific knowledge and understanding Make decisions about which information to use from a wide range of sources	Perform / create simple models to exemplify scientific ideas using scientific terminology where appropriate *simple lever and pulley mechanisms* *Models for the solar system* *Day and night models*	Propose their own ideas and make decisions with agreement in a group Support, listen to and acknowledge others in the group e.g. Yes. I prefer that one too Check the clarity of each other's suggestions e.g. are you saying you think this one is a herbivore? Build on / add to someone else's idea to improve a plan or suggestion Understand that it is okay to disagree with their peers and offer a reasons for their opinion
Year 4	Suggest their own ideas on a concept and compare these with what they observe / find out. Use observations to suggest what to do next Discuss ideas and develop descriptions from their observations using relevant scientific language and vocabulary (from Y4 PoS) Observe and record relationships between structure and function or between different parts of a processes (linked to Y4 PoS) Observe and record changes /stages over time (linked to Y4 PoS)	Make a simple guide to local living things. Use guides or simple keys to classify / identify [animals, flowering plants and non-flowering plants]. Use their observations to identify and classify Begin to give reasons for these similarities and differences. Record similarities as well as differences and/or changes related to simple scientific ideas or processes or more complex groups of objects/living things/ events *(e.g. evaporation and condensation, different food chains, different electrical circuits)*	Ask/raise their own relevant questions with increasing confidence and independence that can be explored, observed, tested or investigated further Ask questions such as 'What will happen if…?" or 'What if we changed…? (linked with Y4 PoS) Choose/select a relevant question that can be answered [by research or experiment / test].	Make decisions about which information to use from a wide range of sources and make decisions about how to present their research Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.	Make a visual representation or a model of something to represent something they have seen or a process that is difficult to see. Suggest their own ideas on a concept and compare these with models or images.	Make some decisions about an idea within a group *(e.g. I think we should find out by testing…)* Increasingly support, listen to and acknowledge others in the group Build on / add to someone else's idea to improve a plan. Understand that it is okay to disagree with their peers and offer reasons for their opinion

Our Lady Star of the Sea SCIENCE KEY SKILLS YEAR 5

Considering Results and Conclusions

	Planning and testing	Using equipment and measure	Communicating	Describing results and looking for patterns	Explaining Results	Trusting Results
	UKS2 - using different types of scientific enquiry making decisions about and explaining choices for testing *LKS2 - making decisions about and setting up simple practical enquiries, comparative tests and fair tests*	*UKS2 - increasing complexity and increasing accuracy and precision* *make their own decisions about the data to collect* *LKS2 - making accurate measurements and gathering data*	*Reporting findings, recording data, presenting findings* *Read, spell and pronounce scientific vocabulary correctly linked to the relevant Yr Grp*	*UKS2 - Looking for patterns analysing functions, relationships and interactions more systematically* *LKS2 - Describing their findings/ results*	*UKS2 - draw conclusions based on / supported by evidence* *LKS2 - reporting on findings saying why something happened*	*UKS2 - comment on how reliable the data is* *LKS2 - suggest improvements for further tests*
Year 6	Predict what a graph might look like before collecting results Make a hypothesis where they say how one thing will affect another and give a reason for their suggestion with a developing understanding of the scientific concept Identify **variables** to change, measure and keep the same in order for a test to be **fair** Independently plan investigations and explain planning decisions Decide when it is appropriate to carry out a **fair test** investigation, comparative test or alternative	Decide whether to **repeat** any **readings** and justify the reason for doing so Make their own decisions about what measurements to take (and begin to identify the ranges used). Make, and act on, suggestions to control/reduce risks to themselves & others Use equipment fit for purpose to take measurements which are increasingly **accurate** and precise Decide the most appropriate equipment to use to collect data	Articulate understanding of the concept using scientific language and terminology when describing abstract ideas, observations and findings (linked to the Y6 PoS) Record data and results of increasing complexity using scientific diagrams and labels, recognised symbols, classification keys, tables, bar and line graphs, and models. Make decisions about how to present and explain their findings through talk, in written forms or in other ways (e.g. using technology)	Spot unexpected results that do not fit the pattern (anomalies) Identify patterns in results collected and describe them using the **change and measure variables** (causal relationships) (e.g. as we *increased the number of batteries* the *brightness the bulb increased*	Identify **evidence** that refutes or **supports** their ideas Independently form a conclusion which draws on the **evidence** from the test (linked to Y6 PoS) Use scientific language and terminology (linked to Y6 PoS) to explain why something happened	Be able to suggest reasons for unexpected results (anomalies) Describe how to improve planning to produce more **reliable** results Say how confident they are that their results are **reliable** and give a reason
Year 5	Carry our **fair tests** and other investigations with increasing independence Suggest more than one possible prediction and begin to suggest which is the most likely. Justify their reason with some knowledge and understanding of the scientific concept Make decisions about which **variable**s to change, measure and keep the same (linked to the appropriate units in the Y5 PoS) Make most of the planning decisions for an investigation. Recognise when it is appropriate to carry out a **fair test**.	Make their own decisions about what observations to make or measurements to use and how long to take them for (recognising the need for repeat readings on some occasions). Take measurements using a range of scientific equipment with increasing accuracy and using more complex scales / **units** Identify possible risks to themselves and others and suggest ways of reducing these Choose the most appropriate equipment and make **accurate** measurements	Use their developing scientific knowledge and understanding and relevant scientific language and terminology to communicate more abstract concepts (linked to Y5 PoS) Present and explain their findings through talk, in written forms or in other ways (e.g. using technology) for a range of audiences / purposes Record data and results of increasing complexity using different formats e.g. tables, annotated scientific diagrams, classification keys, graphs and models Make decisions about the most appropriate way of recording data	Describe straightforward patterns in results linking cause and effect e.g. using er...er or the word 'more' *(e.g. the longer, thinner shapes move through the water more quickly OR the larger the wings, the longer it takes the spinner to fall)* Look for / notice relationships between things and begin to describe these. Comment on the results and whether they **support** the initial **prediction**	Use their scientific K&U and appropriate scientific language and terminology (linked to Y5 PoS) to explain their findings and data and answer their initial question Draw a valid **conclusion** (explain *why* it happened) based on their data and observations (from Y5 PoS)	Begin to recognise how repeated readings improve the **reliability** of results Compare results with others and comment on how **reliable** they are
Year 4	Carry out simple **fair tests** with increasing confidence investigating the effect of something on something else (linked to Y4 PoS). Start to make their own decisions about the most appropriate type of science enquiry they might use to answer scientific questions *(is a fair test the best way to investigate their question?).* Make a **prediction** based on the knowledge acquired from previous explorations / observations and apply it to a new situation Explain their planning decisions and choices Make some of the planning decisions about what to change and measure/observe. Begin to recognise when a **fair test** is necessary.	Begin to identify where patterns might be found and use this to begin to identify what data to collect Make more of the decisions about what observations to make, how long to make them for and the type of equipment that might be used. Recognise obvious risks and how to keep themselves and others safe Learn how to use new equipment, such as data loggers & measure temperature in degrees Celsius (°C) using a thermometer. Collect data from their own observations and measurements, using notes/simple tables/standard **units** Make **accurate** measurements using standard **units** [and more complex units and parts of units] using a range of equipment and scales	Record findings using relevant scientific language and vocabulary (from Y4 PoS), including discussions, oral and written explanations, notes, drawings (annotated), pictorial representations, labelled diagrams, tables and bar charts [where intervals and ranges agreed through discussion], displays or presentations Begin to select the most useful ways to collect, record, classify and present data from a range of choices Make decisions on how best to communicate their findings in ways that are appropriate for different audiences	Notice/find patterns in their observations and data. (Describe the effect of something on something else) *(e.g. as I lengthen the ruler I notice that the pitch gets lower)* With some independence, analyse results / observations by writing a sentence that matches the **evidence** i.e. deciding the important aspect of the result and summarising in a **conclusion** *(e.g. metals tend to be good conductors of electricity)*	Begin to develop their ideas about relationships and interactions between things and explain them Use relevant scientific language and vocabulary (from Y4 PoS) to begin to say/explain *why* something happened	Use results to suggest improvements, new questions and/or predictions for setting up further tests Compare their results with others and give reasons why results might be different