Substantive Knowledge Progression Overview

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants (Biology)	Make observations and drawings of plants. Know similarities and differences between the natural world and contrasting environments. Can plant seeds and care for growing plants. Understand basic plant lifecycle. Know leaf, stem, petals.	Can name common plants and describe the basic parts of flowering plants (deciduous/evergreen) Can describe key features of trees and plants e.g. shapes of leaves, colour of flower, blossom. Can use photos to talk about how plants change. Can talk about plant lifecycles. Know basic parts of plant e.g. leaf, stem, petal, flower, stalk, bud, roots, fruit, bark, blossom.	Can describe how plants have grown from seeds and bulbs and how they have developed over time. Know conditions for plant growth. Can spot similarities and differences in bulbs and seeds. Confident in ordering parts of the plant lifecycle. Know all parts of the plant and their function. Know terms: light, shade, sun, warm, grow, healthy, growth, germinate.	Can explain the function of the parts of a flowering plant. Can explain the life cycle of a flowering plant lifecycle including pollination, seed formation, seed dispersal and germination. Know different methods of seed dispersal. Know the requirements of plant growth and how water is transported through the plant. Know how the sun helps plants photosynthesis. Know terms: photosynthesis, pollen, pollination, absorb, nutrients, reproduce, germination, stamen and style.	Can classify plants in different ways (Living things)	Can explain the lifecycles and processes of a range of different plants and trees. Can use ID guides to identify plants. (Living things)	Can classify plants in different ways using observable characteristics/ similarities and differences. Give reasons for classifying plants based on characteristics (Living things)
Animals including humans (Biology)	Can name a range of animals e.g. farm/jungle. Can group using basic characteristics e.g. land/sea, 4 legs, can fly/cant fly. Can name and point to different body parts e.g. head, body, tummy, knees, legs, arms, toes, eyes, ears, mouth, nose, hair, fingers. Know basic senses e.g.	Can name a range of animals which include animals from each of the vertebrate groups. Understand and categorise animals who are herbivore, carnivore and omnivore. Describe and compare animals based on observable characteristics. Know terms: reptile, amphibian, mammal. Can name, draw and label parts of the human body and say	Can describe how animals change as they get older. Know names of animals and their offspring e.g. goat- Kid. Can order the lifecycle of different animals e.g. butterfly. Can explain what humans and animals need to survive e.g. food, sleep, exercise, water, shelter. Know about microorganisms and how to keep hygienic. Understand the term	Can name the main bones in the skeletal system such as skull, ribs, humerus, vertebrae, pelvis, ulna, carpals, radius, femur, phalanges, patella, tibia, tarsals, fibula, metatarsals. Know the function of the skeletal system. Can describe how muscles and joints help to move. See similarities and differences in skeletons can classify into	Can identify and label and draw main parts of the digestive system and explain the process. Know the different types of teeth in their mouth: molars, pre molars, canines and incisors and their function. Can identify animals and classify based on their teeth whether they are herbivore, omnivore and carnivore. Can order and draw a	Can explain the changes that take place in boys and girls during puberty. Can explain how a baby changes physically as it grows and what it is able to do at each stage. Understand that different animals have different gestation periods. Know the importance of physical and mental health.	Can identify, label and draw parts of the circulatory system e.g. heart, blood vessels, capillaries, arteries, blood. Understand the function of the different parts. Understand how nutrients are transported around the body within animals and humans. Know the impact of a balanced diet, exercise and lifestyle on the way their body's function. Recognise the impact

	touch, taste, hear, see.	what sense is associated. Can name the 5 senses.	balanced diet and can identify some food groups. Understand the effects of exercise on the body. Know terms: offspring, nutrition, reproduction, exercise, hygiene, microorganism, germs.	endoskeleton, exoskeleton and hydrostatic skeleton. Can name different nutrients found in food. Know the different food groups and why we need to eat a balanced diet.	range of lifecycles and food chains. Can identify the producer, predators and prey.		on all body systems learned so far.
Living things/ Evolution and inheritance (Biology)	Can name some plants and animals. Can explore habitats and know where some animals live. Can compare and describe plants and animals.	Know common plants and trees (plants) Identify and name common animals (animals) Know herbivore, carnivore and omnivore (animals) Describe and compare variety of animals (animals)	Can find a range of items which are dead, living and never been alive. Know what a habitat and microhabitat is and identify animals which live in different habitats. Can talk about features of animals and plants and how they are suited to live in particular habitats. Can construct a simple food chain using terms producer, prey, predator, energy. Can identify different sources of food and understand where food comes from.	Identify and describe functions of different plants. (Plants) Identify and describe different animals and how they are adapted to live in different environments. Understand the term climate (Animals) Can explain how a fossil is formed (Rocks).	Can name living things in a range of habitats, giving key features that helped identify them. Can give examples of how an environment might change both naturally and due to human impact. Explain how changes in the environment can be dangerous to animals and lead to extinction. Know that some animals hibernate.	Describe the life cycles of mammals, amphibians and insects using diagrams. Can describe similarities and differences between them. Understand the term reproduction in plants and animals.	Can give examples in the five vertebrate groups and some in the invertebrate group. Can give key characteristics of these groups. Can give examples of flowering and non-flowering plants. Can identify unknown plants using ID and classification charts. Can explain why animals belong to groups. Know that Carl Linnaeus classified plants and animals. Can explain the process of evolution and give examples of how plants and animals are suited/adapted to their environment. Give examples of how animals have evolved over time. Understand that fossils give us evidence of the past and know the process of fossilisation. Recognise that things have changed over time and fossils provide information about living things that inhabited the Earth millions of years ago. (Evolution and Inheritance)
Seasonal	Know the four seasons Can experience different seasons and	Can name the four seasons and identify in the year when they	Know that the sun rises and sets. Understand that we	Light- Can describe how we see objects in light and describe dark	Sound- Can describe different types of objects producing	Earth and space- Know how the earth and moon move.	Light- Can describe using diagrams how light travels in straight

Topic							
Changes/ Earth and Space (Physics) **Light/Sound (Physics)**	describe how they feel. Can comment on the environment e.g. leaves on the ground. Can name some clothes they may wear. Know some weather e.g. rain, wind, sun, snow, cloud. Understand the terms night/day.	occur. Can observe and describe the weather in different seasons. Can describe days being longer in summer and shorter in winter. Compare seasons.	have night and day. Know why the sun helps plants grow. (plants) Know that it is dangerous to look at the sun (animals)	as the absence of light. Know it is dangerous to look at the sun. Understand the term ultra violet. Know the terms transparent, translucent and opaque. Can describe how shadows are formed. Predict which materials will be more/less visible. Know the term reflective and why reflective materials are useful.	different sounds. Know that sound is caused by vibrations. Can describe how sound travels through different mediums e.g air, water, metal. Can find patterns between pitch and volume and the features of the objects producing it. Know that sounds get fainter as the distance from the sound increases.	Know different planets in the solar system. Can understand night and day by explaining the rotation of the earth on its axis. Understand why shadows change using scientific vocabulary and the position of the sun. Can explain how a sundial works. Can explain why we have time zones.	lines, either from sources or reflected from other objects into our eyes. Explain how we see things and can label basic parts of the eye and explain their function. Describe with diagrams how light travels past translucent or opaque objects to form shadows of the same shape. Know how to change the size of shadows by moving objects closer/further from light source.
Forces (Physics) **Electricity (Physics)**	Shows skills in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movement or new images. Understand push and pull.	Understand the terms push and pull. Can move objects by applying a force such as pushing a car.	Know how different materials can be changed by applying a force such as squashing, bending, twisting and stretching.	Compare how things move on different surfaces. Give examples of forces in everyday life. Name a range of magnets and know that magnets have a north and south pole. Show how the poles attract and repel. Can draw diagrams to show the attraction and repulsion between poles of magnets. Can name magnetic and non-magnetic materials.	Electricity- can name the components in a circuit. Can make a simple circuit. Can control a circuit using a switch. Can name some conductors and insulators. Can use drawings to represent their circuits. Can describe how a circuits works. Can name some appliances that run on battery/mains. Know how to make a bulb brighter.	Explain the effects of gravity acting on an unsupported object. Give examples of friction, water resistance and air resistance. Can give examples of the benefits of high/low friction, water resistance and air resistance. Can demonstrate how pulleys, levers and gears work. Know that these systems can make lifting heavy objects easier.	Understand different forces and can apply this knowledge across different subjects e.g. geography. Electricity- Understand voltage and amps. Know how to make bulbs brighter, buzzers louder. Can label and name components in a circuit. Can draw circuits using symbols. Make circuits to solve particular problems such as a quiet and a loud burglar alarm.
Materials (Chemistry) **Rocks (Chemistry)**	Can talk about the similarities and differences between materials. Can describe using basic words. They can group materials based on how they feel or look like.	Can label a picture of an object based on what it is made of. Can describe the properties of materials. Can sort materials using its properties. Know terms: wood, plastic, glass, metal, water and rock.	Compare the suitability of different materials including wood, metal, plastic , glass, brick, rock, paper, cardboard, water. Know that shapes of solid objects can be changed by squashing, bending, twisting and stretching. Can describe similarities and differences.	Compare and group types of rock and give physical features of each. Explain how a fossil is formed. Explain that soils are made from rocks and also contain living/dead matter. Classify rocks in a variety of ways using scientific vocabulary. Describe materials using transparent, translucent and opaque.	Can name properties of solids, liquids and gasses. Can explain process of melting and freezing. Know the terms evaporation and condensation. Can describe the water cycle. Know materials have different melting points. Can test a variety of materials to answer questions.	Can explain everyday uses of materials. Can explain what dissolving is. Can name equipment for filtering and sieving. Know how to recover substances from solutions or mixtures by evaporation, filtering or sieving. Can describe reversible and non-reversible changes to materials and give examples.	

Disciplinary Knowledge Progression Overview

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Asking Questions	Question why things happen. Ask questions to find out how things work.	Ask simple questions. Ask yes and no questions to sort and classify. Raise own questions.	Ask simple questions relevant to the topic. Know their questions can be answered in different ways. Use a range of question stems.	Raise questions can carry out tests with support to find things out. Write a range of questions relevant to the topic. Answer questions posed.	Ask a range of questions to sort and classify. Write a range of questions using own scientific knowledge. Answer questions independently using secondary sources.	Use scientific experiences to explore ideas and raise different higher order questions. Create further questions to investigate. Raise questions and suggest reasons for similarities and differences.	Raise questions to further prove or disprove a scientific enquiry. Raise questions about a range of phenomena.
Make Predictions	Make simple predictions based on comparisons e.g. float or sink.	Make basic predictions over things they can see or their own ideas. Use some scientific vocabulary.	Draw knowledge from observations to make predictions. Begin to test predictions and later answer questions.	Draw on knowledge to make predictions. Add detail to their predictions. Make further predictions based on what's observed or tested.	Predictions are detailed and explain their thinking, they link to tests, data and use scientific language. Raise further predictions from results based on patterns.	Use subject knowledge, observations or previous learning to make predictions. Add detail and explanations. Identify a range of variables which could affect their investigations.	Use test results to make predictions to set up further comparative tests. Uses evidence to support predictions. Develop predictions based on research and scientific knowledge.
Observation and Measurement	Observe and describe what they see using everyday language. Use equipment such as magnifying glasses and viewers. Take measurements by comparing and notice simple patterns e.g. bigger/smaller.	Identify and group, compare and contrast using observations, video and photographs. Observe changes over time and describe changes. Use magnifying glasses, viewers and digital microscopes. Use simple measurement and equipment such as egg timers and stopwatches.	Observe closely and select the correct equipment. Identify a range of plants using ID charts. Observe how plants and animals grow and record findings. Notice similarities and differences. Use observations and ideas to suggest answers to questions. Use standard units to estimate and measure. Use rulers, scales, thermometers and measuring vessels with a degree of accuracy.	Make systematic and careful observations. Select own equipment for observing including digital cameras. Look for naturally occurring patterns. Collect data from own observations. Can make observations and decide how to record them to answer a question. Take accurate measurements using standard units. Use a range of equipment and begin to read digital measurements from data loggers and stop watches.	Make systematic and careful observations to ask questions and group objects using classification keys. Observe closely and explain processes. Identify similarities, differences or changes related to simple scientific ideas or processes. Take and record accurate measurements using standards units to 2dp. Use data loggers to record. Use volt metres and begin to gather repeat readings to increase accuracy.	Observe carefully and make comparisons. Observe changes over a period of time. Make decisions about what to observe to answer questions. Use observation skills and ID kits to identify plants and animals. Take repeat measurements where appropriate. Can find the average of data. Select measuring equipment and use accurately e.g. ruler, tape measure, trundle wheel, force metres.	Make accurate drawings of plants and animals based on observations. Take measurements using a range of scientific equipment with increasing accuracy and precision, taking repeat readings where appropriate. When collecting measurements decide whether to increase sample size for validity and reliability. Record measurements to 3dp. Use protractors, rulers, force metres, volt meters accurately.

Planning Enquiries	Test out ideas and take risks through trial and error. Engage in open ended activities. Choose resources they need for their activity from their environment. Find ways to solve problems.	Begin to recognise ways they may answer scientific questions. Experience different types of enquiry including practical activities. Use resources provided by the teacher and suggest some resources of their own e.g. pipettes.	Plan and carry out simple tests linked to the different types of enquiry. They can carry out a simple comparative test using some of their own ideas. Suggest their own resources to carry out tests.	Set up practical enquiries using comparative and fair tests. Use a range of scientific enquiry. Investigate and answer questions linked to the shared planning frame. Understand some of the variables needed to be controlled with support. Use a range of equipment e.g. thermometers and data loggers.	Identify the type of enquiry needed to answer a question. Follow a plan to carry out observations and tests. Use a planning approach with more independence identifying variables and what needs measuring. Choose their method to carry out their investigation.	Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and changed. Understand what type of scientific enquiry is needed to answer and prove/disprove scientific questions or phenomena.	Choose the type of enquiry needed to carry out their investigation. Pose and answer their own questions, controlling variables where necessary independently. Decide whether sample size needs to be increased for validity. Identify a range of factors which may affect their investigation.
Recording	Draw pictures or objects in their own environment. Take photos of things that interest them. Count results and start to make marks to record results. Sort in at least 2 groups. Create a class pictogram using pictures and objects.	Begin to show some accuracy in drawings, observations and use simple labels. Use scientific vocabulary provided by the teacher. Complete a simple prepared table with some support and scaffolding. Add marks to a chart to complete data.	Gather and record data to help answer questions. Record observations using photo video, drawings, labelled diagrams or in writing. Count results using tally charts. Use prepared tables to record results more independently. Use simple keys based on yes and no questions. Sort into 2 groups with own categories and explain the reason for choices. Record using prepared bar charts.	Record findings using scientific language, drawings and labelled diagrams including detailed labelling and written explanations based on observations. Complete a table where they can add their own headings and results. Use simple classification keys and Venn diagrams. Use Carroll diagrams and give reasons for criteria. Produce bar charts adding own axis labels and headings.	Record findings using systematic and careful observational drawings and labelled diagrams using scientific vocabulary. Present the same data in different ways. Create own tables with headings. Record using classification keys. Use Venn and Carroll diagrams with accuracy. Use discrete and continuous data using line/scatter graphs. Construct bar charts independently.	Present results in a variety of ways to help answer questions. Record ideas using accurate diagrams using scientific language. Create own results table including cause and effect. Record results systematically and repeat readings. Use and develop classification keys. Classify in a number of ways. Use line or scatter graphs to calculate range in a set of data using different scales. Produce line graphs with various increments.	Record data and results with increasing complexity e.g. accuracy of measurements. Use scientific diagrams, models and labels accurately with clarity and using precise scientific language. Calculate mean and average of a set of data. Use and produce classification keys independently by posing questions. Independently collect data and produce scatter and line graphs. Create bar charts and pie charts to present data.
Interpreting and concluding	Offer explanations for why things happen- making use of some recently introduced scientific vocabulary. Develop own narrative and explain by connecting ideas or events. Develop vocabulary which meets the breadth of their experiences.	Use evidence from simple tests when answering questions. With help, begin to notice patterns and relationships. Talk about what they have found out and how they found it out. Can make comparisons and recognise biggest/smallest, most effective/least effective	Communicate findings to an audience using relevant scientific language and illustrations. Identify causal relationships and patterns in results. Identify which results do not fit the overall pattern and explain findings. Refer to the table of results when describing what has	Draws conclusions based on observations. Compare something using results and the conclusion is consistent with the data. Able to adjust opinion and predictions based on results. Give reasons for results including any anomalies. Use	Draw simple conclusions from results to answer questions and support their ideas. Look for casual relationships in data and identify evidence that refutes/supports ideas. Report on findings to an audience orally and in writing using appropriate scientific	Identify patterns and casual relationships that may be found in the natural environment. Interpret data to generate simple comparative statements based on evidence. Use results to draw conclusions and can identify external factors that cannot be controlled	Look for patterns and relationships using a suitable sample. Use oral and written forms such as displays to report conclusions, casual relationships and give an explanation of the degree of trust in their results. Spot anomalies and identify results that do

		from data. Can use simple models to explain processes e.g. seasonal changes, lifecycles.	happened. Draw a basic conclusion (with support from the teacher) using own scientific knowledge, observations and comparisons. Uses results of investigations to answer enquiry questions.	simple scientific language to discuss ideas and communicate their findings in ways appropriate for different audiences orally and written	vocabulary for a range of audiences. Use evidence to suggest values for different items tested using the same method. Draw conclusions based on straightforward evidence and current subject knowledge to support their findings, Suggest improvements and raise further questions.	e.g.temperature inside and outside. Use scientific language and illustrations to discuss, communicate and justify scientific ideas. Use comparative statements to explain results and how things work.	not fit the overall pattern. Use data to refute or support ideas or arguments. Focus on scientific reasons for the overall pattern rather than a comparison. Use labelled diagrams to support their explanation. Use ideas from secondary sources to support their ideas, choosing appropriate websites. Create detailed models to explain processes such as circulatory systems and lifecycles.
Evaluating	Connect ideas, talk about what they have found and say what worked well. Describe how things work in simple terms and make basic alterations and suggest things that did not work (e.g. this button does not work so press this one) Question why things happen. Come up with alternative ways of doing things through exploration. They can say or indicate by smiley faces/scale if they have achieved the learning objective.	With scaffolding and prompting can suggest simple improvements to their enquiries. Talk about some changes that could be made. Use simple success ladders to evaluate their tests or understanding against the learning objective.	With support can suggest improvements to their enquiries. Suggest some things that could be changed and evaluate why things went wrong. Use success ladders with multiple criteria to evaluate the test or their understanding against the learning objective.	Suggest improvements and raises further questions Use evidence and subject knowledge to refute statements. Make suggest improvements from enquiries. Make basic statements about what worked well and what they would change. Use success ladders confidently to evaluate their tests or understanding against multiple criteria and suggest simple next steps.	Evaluate and communicate their methods and findings. Suggest ways to improve what they have already done. Begin to evaluate different aspects of their enquiries such as equipment. Begin to understand how the enquiry improves outcomes from their questions. Use different charts to evaluate such as ranking scales, star diagrams and success ladders. Suggest points for development based on the weakest aspects.	Evaluate when further observations, comparative and fair tests might be needed. Evaluate different aspects of their enquiries such as equipment and accuracy of measurements. State how the enquiry improves outcomes from their questions. Relate their results to the question and state if their test has enabled them to answer it. Use a range of charts to evaluate such as ranking scales, star diagrams including those with negative numbers. Suggest next steps based on the weakest aspects and state how this will help them or the test progress or give different results.	Describe and evaluate their own and other people's scientific ideas using evidence from a range of sources. Evaluate their choice of method, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources. Use scientific language and evaluate how their enquiry has answered the question.

Examples of Progression in Science at Our Lady of the Angels

Biology - Plants
In Reception, children begin by observing and drawing plants, learning to name basic parts like leaf, stem, and petals, and gaining an early awareness of life cycles through planting and caring for seeds. In Year 1, they identify common plants and trees, describe features such as blossoms and leaf shapes, and begin to talk about plant life cycles and seasonal changes using photographs. By Year 2, pupils understand how plants grow from seeds and bulbs, can describe what plants need to grow healthily, and know all main plant parts and their functions. In Year 3, children explore the complete life cycle of flowering plants in more detail, including pollination, seed formation, and dispersal, and they learn about photosynthesis and how water is transported within the plant. Scientific vocabulary such as pollen, nutrients, and reproduction is introduced to support this learning. In Year 4, pupils begin to classify plants within a broader study of living things. By Year 5, they compare life cycles of a variety of plant types and learn to identify them using classification guides. In Year 6, pupils consolidate their knowledge by classifying plants based on observable characteristics and giving scientific reasons for their groupings. systems of classification.

Physics - Materials
In EYFS children begin learning about materials and their properties by observing similarities and differences and using simple language to describe how materials feel or look. They group materials based on their features. In Year 1 pupils label objects according to what they're made of, using terms such as wood, plastic, glass, metal, rock, and water. In Year 2, by comparing the suitability of materials such as wood, plastic, and glass for everyday purposes, they develop insights into why certain materials are chosen for specific uses. This includes recognizing how solid objects can change shape through squashing, bending, twisting, or stretching.   In Year 3 pupils identify the physical features of rocks while sorting them scientifically and develop an understanding of how fossils are formed.   Pupils also learn how soils contain a mixture of rocks and organic matter and begin to describe materials as transparent, translucent, or opaque. In Year 4 pupils learn about the properties of solids, liquids, and gases further building their foundation scientific vocabulary. Pupils also explore processes like melting, freezing, evaporation, and condensation; they study the water cycle, and test a variety of materials for their melting points. In Year 5 pupils develop these ideas further as they investigate dissolving, filtering, and sieving, discovering how substances can be recovered or transformed through both reversible and irreversible changes. In Year 6 pupils return to studying fossils, recognising how life has transformed over time, providing a glimpse into the living things that inhabited the Earth millions of years ago.