St Nicholas and Our Lady & St Patrick's Catholic Primary Schools

Curriculum Flight Path: Science

	Early Years	Year 1 (1/2 Year A)	Year 2 (1/2 Year B)	Year 3 (3/4 Year A)	Year 4 (3/4 Year B)	Year 5 (5/6 Year A)	Year 6 (5/6 Year B)
Possible Themes	**Animals including humans**	**Animals including humans**	**Animals including humans**	**Animals including humans**	**Animals including humans**	**Animals including humans**	**Animals including humans**
Substantive knowledge *As a scientist, I am learning about*	Knows some of the things that make them unique. Talk about some of the similarities and differences in relation to friends or family. Talk about some of the things they have observed such as animals.	Identify and name a variety of common animals including, fish, amphibians, reptiles, birds and mammals Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Notice that animals, including humans, have offspring which grow into adults. FInd out about and describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Identify that animals, including humans, need the right types and 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.	Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey.	Describe the changes as humans develop to old age.	Identify and name the main parts of the 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.
Disciplinary Knowledge *As a scientist, I am learning to*	Evaluating: Talk about the features and how they vary from one animal to another. Explain why some things occur and talk about changes.	Begin to identify and classify. Use appropriate scientific language to communicate ideas. Begin to use their observations and ideas to suggest answers to questions.	Use their observations and ideas to suggest answers to questions.	Begin to ask relevant questions and use different types of scientific enquiries to answer them.	Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Use straightforward scientific evidence to answer questions or to support their findings.	Begin to take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	Use test results to make predictions to set up further comparative and fair tests.

Possible leading enquiry question	**How do my senses help me explore the world around me?**	**What team is my animal in?**	**What helps me to grow?**	**How can I look after and protect my body?**	**What journey does my food go on?**	**How will my body change as I get older?**	**How do I keep a healthy heart?**
Vocabulary (progressive – so what are the new words?)	Animal names Family Friend Parents Brother Sister	Amphibian Reptile Mammal Invertebrate Vertebrate Carnivore Herbivore Omnivore Skeleton Bone	Offspring Reproduce Survival Growth Hygiene Exercise	Nutrition Mammal Skeleton Muscle Joint Socket Ligament Bend Flex	Digest Saliva Mouth Teeth Incisor - cutting/slicing Canine - ripping/tearing Premolar Molar - chewing, grinding Wisdom Teeth Enzyme Oesophagus Stomach Transports Absorbs Small intestine Large intestine Rectum Anus Water Vitamins Acid Producer Consumer (Secondary, Tertiary) Predator Prey	Human Development Baby Toddler Child Teenager Adult Puberty Gestation Length Mass Grows/Grow/Growing	Internal Organs Heart Lungs Liver Kidney Brain Skeletal Skeleton Muscle Muscular Digest Digestion digestive Circulatory System Heart Blood Vessels Blood Impact Diet Exercise Drugs Lifestyle Nutrients Damage Alcohol Substances
Theme	**Everyday Materials**	**Everyday Materials**	**Everyday Materials**	**Light**	**States of Matter**	**Properties & changes of materials**	**Light**
Substantive knowledge *As a scientist, I am learning about*	Can talk about some of the things they have observed such as natural and found objects. Shows an interest in technological toys with knobs or pulleys, or real objects such as cameras or mobile phones.	Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Describe the simple physical properties of a	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses. Compare how things move on different surfaces.	Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous	Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and	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 light travels from

	Shows skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images. Begin to be interested in and describe the texture of things.	variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties	Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the size of shadows change.	at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	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. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. 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.	light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Disciplinary Knowledge *As a scientist, I am learning to*	Predicting. Observing changes over time. Explore and perform simple tests.	Begin to ask simple Qs and recognise that they can be answered in different ways. Begin to perform simple tests.	Ask simple Qs and recognise that they can be answered in different ways. Perform simple tests.	Begin to gather, record, classify and present data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	Set up simple practical enquiries, comparative and fair tests.	Begin to plan different types of scientific enquiries to answer their own questions, including recognising and controlling variables where necessary. Begin to use test results to make predictions to set up further comparative and fair tests.	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Possible leading	**What are my toys made of?**	**How can I keep my teddy bear dry?**	**How can I make my car travel furthest?**	**Is my shadow a reflection of me?**	**Can a material be a solid, liquid and a gas?**	**How do I know if a change is reversible or irreversible?**	**How can I change the direction of light?**

enquiry question							
Vocabulary (progressive – so what are the new words?)	Fast Slow Smooth Rough Bumpy Material Wood Plastic Metal Paper Fabric Soft Hard	Object Properties Man-made material Natural material Malleable Non-malleable Waterproof Non-waterproof Absorbent Non-absorbent Brittle Rigid Shiny Dull Stretchy Squashy	Translucent Squashing Bending Twisting	Reflection Surface Shadow Light Source Natural light Absence of light Opaque Transparent	Solid/solidify Iron Ice Melt Freeze Liquid Evaporate Condense Gas Container Changing State Heat/heated Cool/cooled Degrees Celsius Thermometer Water cycle Evaporation Condensation Temperature Melting Warm/cool Water vapour	Solubility transparency conductive response dissolve liquid solution solute separate separating filtering sieving evaporating reversible/irreversible changes mixing melting conductivity insulation chemical rusting residue	Periscope rainbow filters refraction
Possible Theme	**Living things and their habitats & Seasonal Changes**	**Seasonal Changes** ***Useful to spread across the year/revisit each term.***	**Living things and their habitats**	**Rocks**	**Living things and their habitats**	**Living things and their habitats**	**Living things and their habitats**
Substantive knowledge *As a scientist, I am learning about*	Developing an understanding of growth, decay and changes over time Shows care and concern for living things and the environment. Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world.	Observe changes across the 4 seasons Observe and describe weather associated with the seasons and how day length varies.	Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Identify and name a variety of plants and animals in	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter.	Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things.	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	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. Give reasons for classifying plants and animals based on specific characteristics.

	Developing an understanding changes over time.		their habitats, including microhabitats. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.				
Disciplinary Knowledge *As a scientist, I am learning to*	Know about similarities and differences in relation to places, objects, materials and living things. Make observations of animals and plants. Talk about the features of their own immediate environment and how environments might vary from one another.	Begin to gather and record data to help in answering questions.	Gather and record data to help in answering questions. Identify and classify. Use appropriate scientific language to communicate ideas.	Begin to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Begin to identify differences, similarities or changes related to simple scientific ideas and processes.	Gather, record, classify and present data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	Begin to report and present findings from enquiries, inc conclusions and causal relationships, in oral and written forms such as displays and other presentations, using appropriate scientific language.	Report and present findings from enquiries, inc conclusions and causal relationships, in oral and written forms such as displays and other presentations, using appropriate scientific language
Possible leading enquiry question	**Where is the best place for my minibeast to live?**	**Do all trees stay the same throughout the seasons?**	**Is an animal's habitat important?**	**How can rocks unlock secrets of the past?**	**Who's who in the animal kingdom and will they survive?**	**What is the circle of life?**	**How is a woodlouse related to a crab?**
Vocabulary (progressive – so what are the new words?)	Grow Alive Dead Desert Jungle Hot Cold Light Dark Spring Summer Autumn Winter Sun Wind Rain Cloud Snow Fog	Season Weather Equinox Sunrise Sunset Dusk Dawn Day Night Temperature Wet Dry Wind Thermometer Degrees	Habitat Microhabitat Interdependent Dependent Food chain Predator Prey Energy	Sedimentary Metamorphic Igneous Organic Volcanic Permeable Non-permeable Porous Non-porous Grains Crystals	Environment classification flowering non-flowering plants vertebrate/invertebrate dangers fish amphibians reptiles birds mammals insects plants flowering plants (including grasses) non-flowering (including mosses and ferns) human impact	Asexual/sexual reporduction fertilise gestation life cycle metamorphosis pollination reproduction	Micro-organisms habitat/microhabitat taxonomy bacteria virus fungi

					positive - nature reserves, ecologically planned parks, garden ponds negative - population, development, litter, deforestation		
Possible Theme	**Plants**	**Plants**	**Plants**	**Plants**	**Sound**	**Earth & Space**	**Evolution and Inheritance**
Substantive knowledge *As a scientist, I am learning about*	Talk about some of the things they have observed such as plants. Make observations of plants and explain why some things occur.	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees.	Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.	Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky.	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Disciplinary Knowledge *As a scientist, I am learning to*	Explain why some things occur and talk about changes. Make observations of animals and plants.	Begin to observe closely, using simple equipment.	Observe closely, using simple equipment.	Begin to make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.	Ask relevant questions and use different types of scientific enquiries to answer them. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Identify differences,	Begin to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	

					similarities or changes related to simple scientific ideas and processes.		
Possible leading enquiry question	**What can I see in my garden?**	**What do I know about the trees and plants in my garden?**	**How can my seed change into a flower?**	**Which is the most important part of a flower?**	**How do I hear a siren?**	**Where does the sun go at night?**	**Who am I and where have I come from?**
Vocabulary (progressive – so what are the new words?)	Leaf Flower Sun Water Plant Stem Growth	Common plant Wild plant Garden plant Tree Deciduous Evergreen Flowering Root Trunk	Seed Bulb Bud Temperature Healthy Germination Reproduction	Nutrients Soil Transportation Pollination Dispersal Life Cycle	Vibrate/vibration/ vibrating Air Medium Ear Hear Sound Volume Pitch Faint/fainter Loud/louder String Percussion Woodwind Brass Insulate	Earth planets solar system Moon celestial body sphere/ spherical rotate/ rotation Mercury Venus Mars Jupiter Saturn Uranus Neptune Pluto 'dwarf' planet orbit revolve geocentric model heliocentric model sundials astronomical	fossils offspring vary non identical characteristics variation evolution adaption inherit/inheritance Charles Darwin adapt environment extreme conditions advantageous/disadvantageous palaeontologists
Theme				**Forces and Magnets**	**Electricity**	**Forces and Magnets**	**Electricity**
Substantive knowledge *As a scientist, I am learning about*				Compare how things move on different surfaces. Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others.	Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction that act between moving surfaces. Recognise that some mechanisms including	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.

		Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having 2 poles. Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.	is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.	levers, pulleys and gears allow a smaller force to have a greater effect.	Use recognised symbols when representing a simple circuit in a diagram.
Disciplinary Knowledge *As a scientist, I am learning to*		Begin to set up simple practical enquiries, comparative and fair tests. Begin to use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Begin to use straightforward scientific evidence to answer questions or to support their findings.	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Identify differences, similarities or changes related to simple scientific ideas and processes.	Begin to explain the degree of trust in results. Identify and evaluate scientific evidence (their own and others') that has been used to support or refute ideas or arguments.	Plan different types of scientific enquiries to answer their own questions, including recognising and controlling variables where necessary Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Possible leading enquiry question		**Are magnets magic?**	**What materials do I need to complete a circuit?**	**Which forces will affect my egg drop? (Egg Drop by Mini Grey)**	**How can we use electricity to protect the nation's treasures?**
Vocabulary (progressive – so what are the new words?)		Friction Magnetic Pole Positive Negative Attract Repel	Appliances Electricity Electrical Circuit Cell Wire Bulb Buzzer	Gravity air resistance water resistance surface force effect move	Voltage brightness volume danger series circuit safety symbols

			Danger Electrical safety Sign Insulators Conductors Switch	accelerate decelerate stop change direction brake mechanism pulley gear spring theory of gravitation Galilei Isaac Newton	

WS (Disciplinary skills) for each theme based on focus objectives for TAPS Assessment Task for each unit rather than trying to focus on all WS in a unit. All skills covered over the year.

https://pstt.org.uk/resources/curriculum-materials/assessment

https://pstt.org.uk/application/files/5216/0388/1615/PSTT_working_scientifically_progression_grid_8.3.19.pdf

Overview of TAPS plans for Focused Assessment of Working Scientifically

(Any focus can be chosen for open-ended enquiries, these are only suggestions)

	PLAN	DO			REVIEW	
	Ask Qs + plan enquiry	**Set up enquiry**	**Observe + Measure**	**Record**	**Interpret + Report**	**Evaluate**
R plans	Brown apples	Incy spider shelter	Frozen balloons	Scavenger sort	Butter	Taste test
KS1 (age 5-7) Develop close obs	Ask simple Qs and recognise that they can be answered in different ways*.	Perform simple tests	Observe closely, using simple equipment.	Gather and record data to help in answering questions.	Identify and classify. *Use appropriate scientific language to communicate ideas.*	Use their observations and ideas to suggest answers to questions.
Y1 TAPS plans	Materials: reflection test Materials: transparency	Materials: floating and sinking Teddy zipline	Plants:structure leaf look Shades of colour	Seasons: seasonal change Materials: Bridge testers	Animals inc Humans: animal classification	Animals inc Humans: body parts
Y2 TAPS plans	Materials: waterproof Separating colours	Materials: rocket mice Daisy footprints	Plants:compare growth Ice escape	Living things: woodlice habitats Materials hunt	Living things: nature spotters Living and nonliving	Animals inc H: handspans Materials: boat
LOWER KS2 (age 7-9) **Develop systematic approach**	Ask relevant questions and use different types* of scientific enquiries to answer them.	Set up simple practical enquiries, comparative and fair tests.	Make systematicand careful observationsand, where appropriate,take accurate measurementsusing standard units,using a range of equipment,including thermometersand data loggers.	Gather, record, classify and present data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Identify differences, similarities or changes related to simple scientific ideas and processes.	Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Use straightforward scientific evidence to answer questions or to support their findings.
Y3 TAPS plans	Animals inc Humans: investigating skeletons Cupcake parachutes	Forces:shoe grip Forces:magnet tests	Plants:measuring plants Ice cream	Light:making shadows Forces:cars down ramps	Rocks:rock reports Eco Action	Plants: function of stem Forces: balloon rockets Materials: egg drop packaging
Y4 TAPS plans	Sound:investigating pitch Cornflour slime	Materials: drying materials	Materials: measure temp Electricity:Circuit products	Living things:local survey	Electricity: conductors Sound:string telephones	Animals inc H:teeth(eggs) in liq Materials: Dunking biscuits
UPPER KS2 (AGE 9-11) **Develop independ-ence**	Plan different types* of scientific enquiries to answer *their own questions*, including recognising and controlling variables where necessary.	Use test results to make predictions to set up further comparative and fair tests.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	Report and present findings from enquiries, inc conclusions and causal relationships, in oral and written forms such as displays and other presentations,*using appropriate scientific language.*	Explain degree of trust in results. Identify *and evaluate* scientific evidence *(their own and others')* that has been used to support or refute ideas or arguments.
Y5 TAPS plans	Mat:dissolving Mat:nappy absorbency Forces:paper planes	Materials: insulation layers Zipline testing	Humans: growth survey Forces: spinners Y5/6:Titanic pulleys	Materials: sugar cubes Space:craters Forces:Bottle flip	Materials: champion tapes Living things: life cycle research Solar system research	Forces: aquadynamics Forces: marble run Y5/6:Bridge engineers
Y6 TAPS plans	Electricitybulb brightness Light questions	Animals inc Humans: heart rate	Elect:conductive dough Terrific tasters	Living things: outdoor keys Light:investigating shadows	Living things invertebrate research	Evolution: fossil habitats Evolution: egg strength
Transition	Reaction catches	Yeast growth	Formula 1 tubs	Blood splatter	Lolly stick catapults	Cleaning coins

***Types of enquiry including: observing changes over time, noticing patterns, grouping and classifying, comparative and fair tests, using secondary sources.**

Progression statements are taken directly from England's 2014 National Curriculum, *with small additions in italics from the 2018 Teacher Assessment Framework.*