Science
Year 5 Long Term Plan

Themes (Number of weeks/Term)	Autumn 1 Forces (8 weeks)	Autumn 2 Earth and space Sustainability (7 weeks)	Spring 1 Properties of materials (5 weeks)	Spring 2 Animals, including humans Living things and their habitats (7 weeks)	Summer 1 Living things and their habitats Properties and changes of materials (6 weeks)	Summer 2 Sustainability Living things and their habitats (6 weeks)
NC Content/Coverage	**Physics** **Unit 1:** Forces	**Physics** **Unit 2:** Space **Unit 3**: Global warming	**Chemistry** **Unit 4:** Properties of materials	**Biology** **Unit 5:** Animals, including humans **Unit 6**: Life cycles	**Biology** **Unit 7:** Reproduction A **Chemistry** **Unit 8**: Reversible and irreversible changes	**Chemistry** **Unit 9:** Plastic pollution **Biology** **Unit 10:** Reproduction B
Substantive knowledge teaching sequence	• I can explain what friction is. • I can explain what air resistance is. • I can plan, investigate and evaluate an experiment to explore whether the surface area of a parachute affects how long it takes for it to fall to the ground. • I can explain what water resistance is. • I can explain what gravity is. • I can explain what gears, levers and pulleys are and how they work.	• I can identify the parts that make up the Solar System and explain what the features of the eight planets in the Solar System are. • I can explain how the sizes of the planets differ and what Earth and other planets in the Solar System orbit. • I can explain how long it takes for the Earth to rotate on its axis, how the seasons occur and what causes night and day. • I can identify the features of the moon. • I can explain what global warming is.	• I can test materials based on their magnetism, transparency and hardness. • I can explain what conductors and insulators are and how to work out if a material is a conductor or an insulator. • I can plan and investigate an experiment to explore which material is the best insulator of heat. • I can evaluate the results from my experiment. • I can test the properties of different materials.	• I can explain what the six stages of the human life cycle are and what the key milestones are in the development of babies and children. • I can investigate whether all mammals have the same gestational period and investigate whether there is a relationship between the gestation period of an animal and its lifespan. • I can explain what the four main stages of the life cycle of a mammal are. (Labelled diagram) • I can explain what the life cycle of an	• I can explain what sexual reproduction is. • I can name and identify the male and female reproductive parts of a flowering plant and explain what their functions are. • I can explain what pollination is. • I can explain what asexual reproduction is. • I can plan and investigate an experiment to explore which plant cutting produces the tallest plant. • I can explain what the difference is between soluble and insoluble substances.	• I can explain what the causes of plastic pollution are and make suggestions as to how to reduce plastic pollution. • I can evaluate the findings from my experiment. (Plant cuttings) • I can name and identify the male and female reproductive parts of a flowering plant and explain what their functions are.

		• I can explain how we can reduce our carbon footprint.		amphibian is and how it is similar/different to a mammal. • I can explain what the life cycle of an insect is and how it is similar/different to a mammal and amphibians.	• I can investigate methods to separate certain materials and how to separate a soluble solid from a liquid. • I can explain what reversible and irreversible changes are and I can investigate which changes are reversible and which are irreversible.	
Disciplinary knowledge/Working Scientifically	**Present findings** I know how to report and present findings from enquiries, including conclusions. I know how to begin to identify causal relationships in oral and written forms, e.g. displays. **Plan** I can plan, investigate and **evaluate** an experiment to explore whether the surface area of a parachute affects how long it takes for it to fall to the ground. I know how to make predictions based on scientific knowledge. I know how to identify the dependent, independent and	**Answer questions and make conclusions** I know how to use scientific evidence to answer questions about the seasons. I know how to make conclusions based on scientific evidence and from my own testing and findings. I know how to identify differences, similarities or changes related to simple ideas or processes. **Gather, record and classify data** I know how to gather, record and classify data with increasing complexity to help in answering questions.	**Gather, record and classify data** I know how to gather, record and classify data with increasing complexity to help in answering questions. I know how to record data using scientific diagrams and tables. **Plan** I know how to make predictions based on scientific knowledge: I can use my knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. I know how to plan different types of	**Asking questions** I know how to ask relevant questions and I can use different types of scientific enquiry to answer them. **Gather, record and classify data** I know how to gather, record and classify data with increasing complexity to help in answering questions. I know how to record data using scientific diagrams and labels to explain what the four main stages of the life cycle of a mammal are. **Answer questions and make conclusions** I know how to use scientific evidence to answer questions.	**Present findings** I know how to report and present findings from enquiries, including conclusions. I know how to begin to identify causal relationships in oral and written forms. **Gather, record and classify data** I know how to gather, record and classify data with increasing complexity to help in answering questions. I know how to record data using scientific diagrams and labels. **Answer questions and make conclusions** I know how to use scientific evidence to answer questions:	**Answer questions and make conclusions** I know how to use scientific evidence to answer questions. I know how to make conclusions based on scientific evidence and from my own testing and findings. I know how to identify differences, similarities or changes related to simple ideas or processes. **Present findings** I know how to report and present findings from enquiries, including conclusions. E.g. explaining what the causes of plastic pollution are.

	controlled variables, where appropriate. **Take measurements** I know how to take accurate measurements using a range of scientific equipment. I know how to take repeat readings when appropriate. **Answer questions and make conclusions** I know how to use scientific evidence to answer questions. I know how to make conclusions based on scientific evidence and from my own testing and findings. I know how to identify differences, similarities or changes related to simple ideas or processes.	I know how to record data using scientific diagrams and labels. **Present findings** I know how to begin to identify causal relationships in oral and written forms.	scientific enquiry, with support. I can plan and investigate an experiment to explore which material is the best insulator of heat. I can test materials based on their magnetism, transparency and hardness. I know how to identify the dependent, independent and controlled variables, where appropriate. **Take measurements** I know how to take accurate measurements using a range of scientific equipment. I know how to take repeat readings when appropriate. **Evaluate** I know how to make predictions for new values, suggest improvements and raise further questions. **Answer questions and draw conclusions** I know how to use scientific evidence to answer questions. I know how to make conclusions based on scientific evidence and from my own testing and findings.	I know how to make conclusions based on scientific evidence and from my own testing and findings. I know how to identify differences, similarities or changes related to simple ideas or processes. **Present findings** I know how to report and present findings from enquiries, including conclusions. I know how to begin to identify causal relationships in oral and written forms.	I can investigate which changes are reversible and which are irreversible. I know how to make conclusions based on scientific evidence and from my own testing and findings. I know how to identify differences, similarities or changes related to simple ideas or processes. **Plan** I know how to make predictions based on scientific knowledge. I know how to plan different types of scientific enquiry, with support: I can plan and investigate an experiment to explore which plant cutting produces the tallest plant. I can investigate methods to separate certain materials and how to separate a soluble solid from a liquid. I know how to identify the dependent, independent and controlled variables, where appropriate. **Take measurements** I know how to take accurate measurements	I know how to begin to identify causal relationships in oral and written forms. **Evaluate** I can evaluate the findings from my experiment. (Plant cuttings) I know how to make predictions for new values, suggest improvements and raise further questions.

			I know how to identify differences, similarities or changes related to simple ideas or processes. I can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. I can evaluate the results from my experiment about which material is the best insulator of heat.		using a range of scientific equipment. I know how to take repeat readings when appropriate. **Evaluate** I know how to make predictions for new values, suggest improvements and raise further questions.	
Key vocabulary	Force, Air resistance, Water resistance, Gravitational force, Contact force, non-contact force	Solar System, Sun, Orbit, Planets, Axis, Rotate, Global warming	Transparent, Translucent, Opaque, Electrical conductor, Electrical insulator, Properties	Reproduce, Mammal, Offspring, Life cycle, Amphibian	Stamen, Pistil, Ovary, Dissolve, Soluble, Insoluble, Reversible change, Irreversible change	Plastic pollution, Pollution, Landfill

Additional/ Cross Curricular and continuous opportunities	Whenever an object falls, learners will be asked to explain why that is happening. In PE, pupils will be asked to retrieve their knowledge of forces e.g. Gravity in ball games, air-resistance in athletics. In Y4 and Y5 units using levers and pulleys, pupils will be asked to retrieve and apply their learning from this unit. <u>Continuous opportunities</u> ○ Friction and Surface Exploration Station – ramps, toy cars, and different surfaces (sandpaper, cloth, smooth boards) for children to investigate how friction affects motion. ○ Air Resistance Investigation Area – parachutes of different sizes, paper shapes, or fabric pieces to explore how surface area affects falling speed. ○ Water Resistance Station – containers of water, floating and submerged objects and timers to explore how water slows down motion. ○ Gravity Demonstration Zone – dropping	As the seasons change, pupils will be asked to explain why daylight hours are longer/shorter, or to observe and explain the length of shadows. The children will revisit the topic of time when discussing Earth's rotation, night and day and the seasons. <u>Continuous opportunities</u> ○ Solar System Exploration Station – models, posters, and interactive digital simulations of the planets for children to explore their features, sizes and positions. ○ Orbit and Rotation Demonstration Area – globes, torches, and planet models to investigate day and night, seasons and planetary orbits. ○ Moon Observation Zone – images, 3D models, or telescopes (if possible) to explore the Moon's features, phases and relative size. ○ Climate Change Awareness Station – infographics, videos, and case studies explaining global warming, its causes	Where appropriate across the curriculum, ask children to describe common materials based on their properties in order to retrieve and apply learning from this unit. Similarly, ask children incidental questions about insulators and conductors such as: Why is our classroom light switch made of plastic? Why are the wires on a laptop plastic? <u>Continuous opportunities</u> ○ Material Properties Exploration Station – a variety of materials (metal, wood, plastic, glass, fabric) for children to test magnetism, transparency and hardness. ○ Conductors and Insulators Investigation Area – wires, batteries, bulbs, and small circuits for testing which materials allow electricity to flow and which act as insulators. ○ Thermal Insulation Experiment Station – containers, water, thermometers, and different materials (foil, wool,	The children will have opportunities for the reinforcement and retrieval by keeping tadpoles and observing them over time. <u>Continuous opportunities</u> ○ Human Life Cycle Exploration Station – posters, diagrams, and models showing the six stages of human life, with key milestones for babies and children. ○ Gestation Investigation Area – charts or data sets for comparing gestational periods of different mammals and exploring relationships with lifespan. ○ Mammal Life Cycle Station – labelled diagrams, 3D models, or interactive resources showing the four main stages of mammal development. ○ Amphibian and Insect Life Cycle Zone – models, pictures, or videos showing frog/toad and insect metamorphosis to compare with mammals. ○ Observation and Recording Station – worksheets, clipboards, or digital	In DT Food, pupils will be asked to explain which changes are reversible and irreversible, retrieving and applying learning from this unit. The children will use their drama skills to act out the process of pollination. <u>Continuous opportunities</u> ○ Plant Reproduction Exploration Station – real or model flowering plants for children to identify male and female parts, observe pollination and explore sexual and asexual reproduction. ○ Cutting Growth Investigation Area – plant cuttings, soil, pots, and measuring tools for children to test which cutting grows tallest under different conditions. ○ Soluble and Insoluble Substances Station – various powders and liquids (e.g., salt, sand, sugar, water) for children to test solubility and explore separation techniques. ○ Separation Methods Exploration Zone –	The children will use their mathematical skills to plot a line graph to show the growth of the plant cuttings over time. <u>Continuous opportunities</u> ○ Plastic Pollution Awareness Station – images, videos, and models showing plastic pollution in oceans, rivers, and local environments; prompts for children to discuss causes and solutions. ○ Environmental Action Area – interactive activities such as sorting recyclable vs non-recyclable materials, designing posters, or creating small campaigns to reduce plastic use. ○ Plant Reproduction Exploration Station – real or model flowering plants for children to identify male and female parts and explore pollination. ○ Plant Cutting Investigation Zone – pots, soil, and cuttings for children to test growth under different conditions, linking to evaluation skills.

	objects of different masses safely to observe the effect of gravity and discussing forces acting on objects. ○ Simple Machines Exploration Station – pulleys, levers, and gears for hands-on manipulation to understand how they work and affect force. ○ Observation and Recording Station – clipboards, data tables, or digital devices for children to plan experiments, record measurements and evaluate results. ○ Reference Books / Digital Resources – age-appropriate guides, videos, and simulations explaining friction, air and water resistance, gravity and simple machines. ○ Practical Modelling Activities – designing ramps, parachutes, or pulleys to test and demonstrate how forces affect motion; building mini-gear and lever systems to lift or move objects.	and environmental impact. ○ Carbon Footprint Investigation Area – interactive charts, calculators, and discussion prompts to explore ways humans can reduce energy use and carbon emissions. ○ Observation and Recording Station – worksheets, journals, or digital devices for children to record observations, create planetary fact files and present findings. ○ Practical Modelling Activities – building scale models of the Solar System, simulating Earth's rotation with torches and globes, or designing "eco-friendly" projects to reduce carbon footprint. ○ Reference Books / Digital Resources – age-appropriate guides and websites on the planets, Earth's rotation, seasons and environmental issues.	polystyrene, fabric) for children to test which material best insulates heat. ○ Observation and Recording Station – worksheets, clipboards, or digital devices for planning experiments, recording measurements and evaluating findings. ○ Practical Sorting and Classification Area – mats or charts to group materials by property (magnetic/non-magnetic, transparent/opaque, conductor/insulator, hard/soft). ○ Reference Books / Digital Resources – age-appropriate guides and videos explaining material properties, electrical conductivity and thermal insulation. ○ Hands-on Modelling Activities – creating mini "insulation challenges," building simple circuits, or comparing different materials in everyday objects for conductivity and thermal properties. ○ Investigation Journals – for children to predict,	tablets for children to record observations, classify life cycle stages and make comparisons between species. ○ Practical Modelling Activities – creating life cycle wheels, sequencing cards, or clay/lego models to illustrate development stages for mammals, amphibians and insects. ○ Reference Books / Digital Resources – age-appropriate guides, videos, and interactive apps on life cycles, reproduction and growth in different species. ○ Investigation Journals – for children to plan investigations, record predictions, analyse data and evaluate patterns in gestation and life cycles.	sieves, filters, evaporation setups, and simple distillation models to separate mixtures and demonstrate soluble vs insoluble solids. ○ Reversible and Irreversible Changes Area – activities to explore melting, freezing, dissolving (reversible) versus burning, rusting, or cooking (irreversible). ○ Observation and Recording Station – worksheets, clipboards, or digital devices for children to plan investigations, record results and evaluate findings. ○ Practical Modelling Activities – creating life cycle wheels for plants, conducting mini-separation experiments, or demonstrating reversible and irreversible changes with safe classroom materials. ○ Reference Books / Digital Resources – age-appropriate	○ Observation and Recording Station – worksheets, journals, or digital devices for children to record plant growth data, evaluate experimental findings and reflect on environmental issues. ○ Practical Modelling Activities – making plant life-cycle wheels, demonstrating pollination with models, or simulating plastic waste reduction in school. ○ Reference Books / Digital Resources – age-appropriate guides, videos and interactive materials on plastic pollution, recycling and plant reproduction.

			test, record results, and reflect on why certain materials behave differently.		guides, videos, and interactive simulations on plant reproduction, solubility and physical/chemical changes.	
	• Each science lesson will start with a 'Quick Quiz' which will recall information taught in the last lesson, last week, two or three weeks ago and last term or last year. • Exit quizzes will be used as and when appropriate. • Wherever possible, a quick verbal quiz of scientific knowledge, e.g. lining up at the door, waiting to get their things for home time. • Teachers will display the vocabulary related to their particular units on their working wall as well as the types of enquiry so children can relate to this when completing activities in class as well as retrieval activities. • Vocabulary Bingo! Teachers to create bingo cards with science terms or concepts and call out definitions or descriptions. This could be used within science lessons or as a recall activity at an opportune time for the class teacher.					
Commentary: Why are we teaching what we are teaching, in the order we are teaching it?	**Forces** From their work on forces in Y3, pupils know what friction is. This unit builds on this, starting	**Space** In this unit, pupils use their understanding of gravity from unit 1 to explore space, the	**Properties of materials** This unit has been split over two terms due to the large amount of National Curriculum	**Animals, including humans** This unit is taught before life cycles so that pupils can explore the life cycle	**Reproduction A** This unit is taught after pupils have learned about the changes in	**Plastic pollution** In this sustainability unit, pupils build upon their prior knowledge from the spring term materials

What does each unit build on/prepare children for? **How are resources and skills changing over time?**	with a recap of what friction is, its effects, how it works and its uses in everyday life. Pupils then build on this knowledge by looking at air resistance. They will learn that air resistance is a type of friction force on an object moving through air. When learners plan their first experiment in this unit, they are introduced to the term variables for the first time. This includes the independent, dependent and controlled variables. They will have the opportunity to use these terms again in further units in their current year and again in Y6. In KS3, pupils extend their knowledge of forces further by continuing to learn about forces as pushes or pulls that cause changes in motion or shape. They will also explore different types of forces, both contact and non-contact.	motion of the planets and the Solar System for the first time. Once learners have an understanding of the key terms and what makes up the Solar System, they are introduced generally to global warming and the effects it is having on the planet ready to explore the impacts of global warming further in the next unit. In KS3, the children will build upon this knowledge by learning in greater detail about orbits, gravity and mass vs. weight. They will also explore scientific models explaining celestial movements and explanations using evidence and models. **Global warming** In this year's first sustainability unit, pupils use knowledge from the previous unit to build upon their understanding of planet Earth and explore the current issues around climate change and global warming. Pupils will gain a simple understanding of global warming, what it is and why it is happening. This builds	content. Learners begin this unit by testing everyday materials and grouping them based on their transparency, hardness and magnetism building on and revisiting the work from previous years where these concepts were introduced. Learners then move on to testing some everyday materials and grouping them based on their electrical conductivity. This builds on the electricity unit studied in Year 4. When the pupils progress onto their investigation, they will use their prior knowledge from Year 4 (States of matter unit) to use a thermometer to accurately measure the temperature of water over time. The terms independent, dependent and controlled variables will also be revisited from previous Y5 units. In KS3, pupils will build upon this knowledge when they learn how materials are classified and how their physical and chemical properties make them suitable for different uses. They also explore how these	of humans before applying this understanding to the life cycle of other organisms. This learning builds upon the pupil's previous knowledge from Year 3 where they looked at the skeletal system. During the year, they will also be revisiting this knowledge through their PSHCE units and have their 'Big Talk'. In KS3, pupils further build upon this learning when they study the reproductive systems and hormones in more detail as well as puberty and hormonal control. They will also look at the biological mechanisms of growth, reproduction and aging. **Life cycles** Living things and their habitats has been split into life cycles and reproduction A and B. Using knowledge of the human life cycle from the previous unit, pupils now explore the life cycle of other organisms. Following investigation of the life cycles of mammals, pupils explore that of amphibians building upon what they learnt about amphibians	puberty in PSHE units and their 'Big Talk'. In the first lesson of this unit, pupils are introduced to sexual reproduction for the first time, building upon their knowledge from the previous block where they explored the life cycles of different animals. When pupils explore the reproductive parts in plants in this unit, they are building on their prior knowledge of flowering plants from Y3 where they learned the names of the male and female parts. Pupils now learn the names and functions of the specific male and female reproductive parts in plants. They then move on to look at pollination building upon their knowledge from Year 3. As pupils move through this unit, they build on their knowledge of reproduction by exploring asexual reproduction. This knowledge will support learners as they move into Year 6 and look at inheritance. This unit helps to prepare pupils for KS3, where	block where they identified different materials and their properties. In the second lesson in this unit, it could be useful to use familiar food chains from Year 4 to introduce pupils to the fact that living things not directly exposed to plastic waste can still be affected by its pollution. In KS3, the learners are introduced to plastic pollution although it is not a standalone topic. Instead, it is taught as part of several areas of the science curriculum and sometimes supported by geography or PSHE. **Reproduction B** Reproduction is split over two blocks as pupils explore asexual reproduction in plants and try to grow new plants using parts of a parent plant. This unit is split to allow for plant growth. In the third lesson of this unit, the learners will work scientifically to interpret data from other plant experiments. The pupils will have recently explored graphs in maths

		upon and extends pupils' knowledge from Y4 about gases and their properties, introducing and explaining the term 'greenhouse gases'.	properties can be changed, for example by heating or mixing materials.	in the previous year group. In KS3, the learners then move beyond the simple life cycle concepts and develop a deeper, scientific understanding of life cycles across different organisms.	they will learn about human reproduction. **Reversible and irreversible changes** This unit is taught at this point as it is a more complex topic. This unit gives pupils the opportunity to revisit their knowledge of solids, liquids and gases from the states of matter unit in Year 4. In KS3, pupils study reversible changes (like melting) that can be undone and irreversible changes (like burning) that produce new substances that cannot easily be reversed.	and this lesson is an opportunity for them to plot a line graph to show the change in the height of a plant over time. This unit helps to prepare pupils for KS3, where they will learn about human reproduction, including puberty, reproductive organs, fertilisation, pregnancy and birth. They also study plant reproduction, covering flower structure, pollination, fertilisation, seed formation, dispersal and the difference between sexual and asexual reproduction.
Adaptations for LA pupils	• Pre-teach key vocabulary using pictures, diagrams and simple definitions. • Use practical demonstrations and hands-on investigations to explore friction, air resistance, water resistance and gravity. • Break learning into small, manageable steps with clear	• Pre-teach key vocabulary using pictures, labelled diagrams and simple definitions. • Use visual models (e.g. globes, balls and lamps), videos and animations to demonstrate the Solar System, day and night, and the seasons. • Break learning into small, manageable steps with clear	• Pre-teach key vocabulary using pictures, real objects and simple definitions. • Use hands-on investigations to explore material properties such as hardness, transparency, magnetism, conductivity and solubility. • Break learning into small, manageable	• Pre-teach key vocabulary using pictures, labelled diagrams and simple definitions. • Use life cycle diagrams, sequencing cards and videos to support understanding of animal growth and development. • Break learning into small, manageable steps with clear	• Pre-teach key vocabulary using pictures, simple definitions and word banks. • Use clear diagrams, models and videos to support understanding of reproduction and changes of state. • Break learning into small, manageable steps with clear modelling and frequent repetition.	• Pre-teach key vocabulary using pictures, simple definitions and word banks. • Use real-life examples, images and short videos to support understanding of plastic pollution and plant reproduction. • Break learning into small, manageable steps with clear

	modelling and frequent repetition. • Use real-life examples (e.g. bicycles, parachutes, boats and playground equipment) to make abstract concepts more accessible. • Provide scaffolded investigation sheets with prompts for predictions, observations and conclusions. • Use simple models or equipment to demonstrate how gears, levers and pulleys work. • Encourage paired talk before independent work to develop understanding and confidence. • Provide sentence stems and key words (e.g. "Gravity is…", "Friction happens when…", "A lever helps by…"). • Allow alternative recording methods such as drawing, labelling, matching,	modelling and frequent repetition. • Provide practical activities such as ordering the planets, comparing planet sizes and modelling the Earth's rotation and orbit. • Use scaffolded diagrams and sequencing activities to support understanding of the movement of the Earth and Moon. • Encourage paired talk before independent work to develop understanding and confidence. • Provide sentence stems and key words (e.g. "The Earth rotates…", "Day and night happen because…", "Global warming is…"). • Allow alternative recording methods such as drawing, labelling, matching, sequencing or oral explanations instead of extended writing.	steps with clear modelling and frequent repetition. • Provide structured sorting and grouping activities using real materials or picture cards. • Model dissolving and separation experiments before pupils carry them out with scaffolded support. • Use scaffolded investigation sheets with prompts for predictions, observations and conclusions. • Encourage paired talk before independent work to develop understanding and confidence. • Provide sentence stems and key words (e.g. "This material is…", "The substance dissolved because…", "A conductor is…"). • Allow alternative recording methods such as drawing, labelling, matching,	modelling and frequent repetition. • Provide scaffolded labelled diagrams of mammal, amphibian, insect and bird life cycles. • Use practical sorting and matching activities to compare similarities and differences between life cycles. • Support investigations with structured recording sheets, prompts and adult guidance where needed. • Encourage paired talk before independent work to develop understanding and confidence. • Provide sentence stems and key words (e.g. "The first stage is…", "This life cycle is similar because…", "Gestation means…"). • Allow alternative recording methods such as drawing, labelling, matching, sequencing or oral	• Provide scaffolded labelled diagrams for plant reproduction (male and female parts). • Use practical, hands-on investigations (e.g. dissolving, mixing, melting, burning demonstrations) to support understanding of reversible and irreversible changes. • Provide sorting activities (e.g. reversible/irreversible changes, soluble/insoluble substances). • Encourage paired talk before independent work to develop understanding and confidence. • Provide sentence stems and key words (e.g. "Reversible changes are…", "Pollination happens when…", "Asexual reproduction is…"). • Allow alternative recording methods such as drawing,	modelling and repetition. • Provide scaffolded diagrams of flowering plants with labelled parts and prompts for functions. • Use sorting activities (e.g. causes of pollution / ways to reduce it) with visual support. • Encourage paired talk before independent work to build understanding and confidence. • Provide sentence stems and key words (e.g. "Plastic pollution is caused by…", "We can reduce plastic pollution by…", "The function of the stamen is…"). • Allow alternative recording methods such as drawing, labelling, matching or oral explanations instead of extended writing. • Use practical or local examples to make

	sequencing or oral explanations instead of extended writing. • Reinforce key scientific vocabulary and concepts through regular recap and retrieval activities.	• Use real-life examples to help pupils understand global warming and simple ways to reduce their carbon footprint. • Reinforce key scientific vocabulary and concepts through regular recap and retrieval activities.	sorting tables or oral explanations instead of extended writing. • Reinforce key scientific vocabulary and concepts through regular recap and retrieval activities.	explanations instead of extended writing. • Reinforce key scientific vocabulary and concepts through regular recap and retrieval activities.	labelling, matching, sequencing or oral explanations instead of extended writing. • Reinforce key scientific vocabulary and concepts through regular recap and retrieval activities.	environmental learning meaningful. • Reinforce key scientific vocabulary and concepts through regular recap and retrieval activities.
	○ Use structured investigation templates and sentence stems to scaffold explanations, comparisons, planning, observations, and evaluation of experiments. ○ Break practical activities, experiments and written tasks into small, supported or guided steps with frequent checks for understanding, deploying adult support as necessary.					
Adaptations for GD pupils	• Encourage pupils to explain *how and why* different forces affect the movement of objects, linking ideas to real-life examples. • Use higher-order questioning (e.g. "Why do some objects fall faster than others?" "How can forces be reduced or increased to improve performance?"). • Challenge pupils to compare friction, air resistance, water resistance and	• Encourage pupils to explain *how and why* the movements of the Earth, Moon and planets create observable patterns, rather than simply describing them. • Use higher-order questioning (e.g. "Why do we experience day and night?" "How would life on Earth change if its rotation or orbit were different?"). • Challenge pupils to compare the planets of the Solar System, explaining how their size, composition	• Encourage pupils to explain *how and why* the properties of materials determine their uses, rather than simply identifying their properties. • Use higher-order questioning (e.g. "Why is one material more suitable than another for a particular purpose?" "How do the properties of a material affect its performance?"). • Challenge pupils to classify materials using multiple	• Encourage pupils to explain *how and why* life cycles differ between animal groups, rather than simply describing each stage. • Use higher-order questioning (e.g. "Why do different animals have different life cycles?" "How do life cycles help species survive in different environments?"). • Challenge pupils to compare and evaluate the life cycles of mammals, amphibians, insects	• Encourage pupils to explain *how and why* sexual and asexual reproduction occur, linking structure, function and the survival of species. • Use higher-order questioning (e.g. "Why might a plant reproduce sexually instead of asexually?" "What are the advantages and disadvantages of each method?"). • Challenge pupils to compare sexual and asexual reproduction,	• Encourage pupils to explain the *causes, consequences and long-term impacts* of plastic pollution using scientific evidence. • Use higher-order questioning (e.g. "Why is plastic pollution a global issue?" "Which solutions are likely to have the greatest impact, and why?"). • Challenge pupils to evaluate different strategies for reducing plastic pollution at local, national and global

	gravity, explaining how these forces interact in different situations. • Encourage pupils to plan and evaluate investigations into forces, making justified predictions and drawing evidence-based conclusions. • Explore how gears, levers and pulleys provide a mechanical advantage, explaining how they make work easier. • Challenge pupils to apply their understanding of forces and simple machines to solve practical engineering problems or design challenges. • Expect pupils to use precise scientific vocabulary and support explanations with scientific reasoning, observations and evidence.	and position affect their characteristics. • Encourage pupils to apply their understanding of Earth's rotation and orbit to explain day and night, the seasons, and the apparent movement of the Sun. • Explore how the Moon's movement relative to the Earth influences observations from Earth, making links to its appearance over time. • Challenge pupils to evaluate the evidence for global warming and assess how different actions can reduce carbon emissions at individual, school and global levels. • Provide opportunities for independent research using reliable scientific sources to investigate current environmental issues.	properties and justify their reasoning with scientific evidence. • Encourage pupils to investigate factors that affect dissolving and explain the difference between dissolving and other changes. • Explore different methods of separating mixtures and evaluate which method is most effective for different situations. • Challenge pupils to design fair tests to identify electrical and thermal conductors and insulators, explaining their conclusions using evidence. • Expect pupils to use precise scientific vocabulary and support explanations with observations, data and scientific reasoning.	and birds, identifying patterns, similarities and key differences. • Encourage pupils to analyse data on gestation periods and lifespans, identifying trends and considering whether the evidence supports their predictions. • Explore how growth, development and reproduction are adaptations that help organisms survive and reproduce successfully. • Challenge pupils to interpret scientific data, draw evidence-based conclusions and evaluate the reliability of their findings. • Expect pupils to use precise scientific vocabulary and support explanations with scientific reasoning, evidence and comparative analysis.	explaining how each supports variation or reproduction in different environments. • Encourage pupils to use scientific reasoning to explain why some substances are soluble while others are insoluble. • Challenge pupils to investigate and classify changes as reversible or irreversible, justifying their decisions using evidence about particle behaviour and the formation of new materials. • Explore how scientific evidence can be used to distinguish between physical and chemical changes, including identifying indicators that a new substance has formed. • Expect pupils to design fair tests, evaluate the reliability of their	levels, justifying their recommendations. • Encourage pupils to make links between human actions, ecosystems and biodiversity, considering the environmental impact of plastic waste. • Challenge pupils to explain how the male and female reproductive parts of a flowering plant work together during pollination and fertilisation. • Provide opportunities for independent research into environmental issues and sustainable solutions, using reliable scientific sources. • Expect pupils to use precise scientific vocabulary and support explanations with evidence, data and

		• Expect pupils to use precise scientific vocabulary and support explanations with scientific reasoning, evidence and data.			results, and use precise scientific vocabulary to communicate evidence-based conclusions.	reasoned conclusions.
Resources/approaches	Rosenshine principles ○ **BBC Bitesize (KS2 Science – Forces & Mechanisms)** – clear explanations and animations covering friction, air and water resistance, gravity and simple machines such as levers, pulleys and gears. ○ **Oak National Academy** – structured KS2 lessons exploring forces, resistance, gravity, and simple machines with practical demonstrations. ○ **STEM Learning** – practical classroom activities and investigations focused on forces and mechanical systems. ○ **Practical resources/ equipment (parachutes made from different materials, timers,**	Rosenshine principles ○ **BBC Bitesize (KS2 Science – Earth & Space / Climate Change)** – child-friendly explanations, diagrams, and videos on the Solar System, planets, day and night, seasons, the Moon and global warming. ○ **Oak National Academy** – ready-made KS2 lessons on Earth and Space (planets, rotation, seasons) and environmental responsibility. ○ **ESA** – high-quality images and short videos of planets and the Moon to support accurate scientific understanding. ○ **NASA** – visuals, simple explainers, and classroom-friendly resources about the Solar System, Earth's	Rosenshine principles ○ **BBC Bitesize (KS2 Science – Properties of Materials)** – clear explanations and short videos on material properties (magnetism, transparency, hardness), conductors and insulators and fair testing. ○ **Oak National Academy** – ready-made KS2 lessons on materials, testing properties, electrical and thermal conductivity and evaluating results. ○ **STEM Learning** – practical enquiry activities for investigating insulation and material properties using everyday items. ○ **Practical resources / equipment (magnets, torches, clear/opaque materials, scratch test**	Rosenshine principles ○ **BBC Bitesize (KS2 Science – Living Things & Life Cycles)** – clear explanations, diagrams, and short videos on human life stages, mammal life cycles and comparisons with amphibians and insects. ○ **Oak National Academy** – ready-made KS2 lessons on human development, animal life cycles and enquiry skills (planning, investigating, evaluating). ○ **Natural History Museum** – child-friendly resources and images on animal life cycles, habitats, and adaptations to support accurate scientific understanding. ○ **Practical resources / visuals (life-cycle**	Rosenshine principles ○ **BBC Bitesize (KS2 Science – Reproduction & Materials)** – explanations and interactive content on sexual and asexual reproduction, plant reproductive parts, pollination, solubility and reversible/irreversible changes. ○ **Oak National Academy** – ready-made KS2 lessons covering plant reproduction, solubility, separation methods and chemical/physical changes. ○ **Royal Institution / Science Museum** – videos and practical demonstrations on plant reproduction, solubility experiments and	Rosenshine principles ○ **BBC Bitesize (KS2 Science – Environment & Plant Reproduction)** – explanations and interactive content on plastic pollution, plant reproductive parts and evaluating experiments. ○ **Oak National Academy** – ready-made KS2 lessons on environmental issues, plant reproduction and evaluating scientific findings. ○ **Royal Institution / Science Museum** – videos and practical demonstrations on plastic pollution and plant reproduction experiments. ○ **Practical resources / visuals (flowering plants for dissection, plant cutting kits, diagrams of**

	weights, ramps, pulley kits, gears and levers models) – to support hands-on experimentation, observation, and evaluation of forces in action.	rotation, the Moon and climate science. ○ **Practical resources / visuals (planet models, orrery, globes and torches for day/night & seasons, Moon phase charts, carbon footprint checklists, posters on climate action)** – to support modelling, discussion, and enquiry-based learning.	**tools, thermometers, hot water, insulation materials such as foil, fabric, bubble wrap, data tables)** – to support hands-on investigation and evaluation skills.	**models, labelled diagrams, growth milestone charts, data sets on gestation periods and lifespans, comparison tables)** – to support investigation, comparison, and explanation of similarities and differences across species.	reversible/irreversible changes. ○ **Practical resources / visuals (flowering plants for dissection, plant cutting kits, beakers, filter paper, thermometers, hot water, labelled diagrams, examples of soluble/insoluble substances, objects to test reversible/irreversible changes)** – to support hands-on experiments, observation and explanation.	**reproductive parts, images or infographics on plastic pollution, recycling examples)** – to support hands-on experiments, observation and discussion of environmental impact.
Career links	Scientist: Isaac Newton Unit 1 careers: Mechanical engineer Aerospace engineer Railway engineer Pilot Sports scientist Athletic coach Meteorologist Game or simulation designer	Scientist: Mae Jemison Unit 2 careers: Astronaut Astronomer Space scientist Unit 3 careers: Climate scientist Meteorologist Environmental scientist Ecologist Renewable energy engineer Environmental engineer Sustainable design architect	Scientist: Ruth Benerito Unit 4 careers: Materials scientist Chemist Physicist Electrical engineer	Scientist: Virginia Apgar Unit 5 careers: Veterinarian Animal breeder Reproductive biologist Paediatrician Midwife Doctor Unit 6 careers: Ecologist Zoologist Botanist Marine biologist Wildlife conservationist Beekeeper	Scientist: David Attenborough Unit 7 careers: Obstetrician Midwife Botanist Horticulturist Plant breeder Unit 8 careers: Chemist Food scientist Pharmaceutical scientist	Scientist: Jane Goodall Unit 9 careers: Environmental scientist Marine biologist Microplastics researcher Environmental engineer Recycling engineer Unit 10 careers: Obstetrician Midwife Botanist Horticulturist Plant breeder