Randlay Primary School and Nursery

'Working Together as One'

Science Policy

Date: Summer 2026
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Contents

1 Rationale

Science plays a crucial role in developing curiosity, critical thinking, and problem-solving skills in children. The purpose of science education is to equip students with the knowledge, concepts, and skills needed to explore the world around them and understand the natural phenomena that shape our lives. As Albert Einstein once said, "The important thing is to not stop questioning." This quote underpins our approach to science at Randlay, where we encourage children to be curious, ask questions, and seek answers through investigation and experimentation.

We believe that science is a dynamic, hands-on subject that should be explored through inquiry, exploration, and practical experiences. Pupils should have the opportunity to develop their scientific understanding across biology, chemistry, and physics while learning to think critically and solve problems. Science is not just about memorizing facts, but about nurturing a mindset that questions, investigates, and discovers.

While science is often linked to other areas of the curriculum, it is essential that it retains its distinct focus on enquiry, experimentation, and the development of scientific knowledge and skills. At Randlay, we aim to inspire children to become lifelong learners and explorers of the world through the lens of science.

2 National Curriculum Aims

Purpose of study:

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

3 Intent

At Randlay Primary School and Nursery, our intent for science is to excite, inspire and ignite a lifelong curiosity in our pupils. We aim to develop confident,

critical thinkers who are eager to explore, question, and understand the world around them. Science is taught as a distinct subject, with meaningful links made across the wider curriculum to show the relevance of science in everyday life.
Our curriculum is rooted in the National Curriculum and informed by the recommendations from *Finding the Optimum: The Science Subject Report* (DfE, 2023). It is carefully sequenced to develop secure, connected scientific knowledge from Reception through to Year 6, supporting both substantive and disciplinary understanding.
We follow the White Rose Science scheme of work, adapted to suit our two-year rolling programme and 1.5 form entry. This ensures broad and balanced coverage, progression across year groups, and full alignment with both Ofsted expectations and the National Curriculum. The scheme's structure allows for revisiting key topics—such as plants or forces—deepening understanding and reinforcing prior learning.
Our hands-on curriculum emphasises enquiry-based learning. Pupils develop essential skills such as observing, predicting, hypothesising, measuring, and evaluating through high-quality practical investigations. Scientific enquiry is embedded in every topic, enabling pupils to think and work scientifically with increasing independence and sophistication.

Key features of our curriculum include:

- **Structured progression** of knowledge and skills across year groups.
- **Scientific enquiry** skills developed in every unit.
- **Curiosity and independent thinking** nurtured through real-life contexts.
- **Hands-on, practical learning** to engage and inspire.
- **Key concepts** in biology, chemistry, physics, and earth science taught progressively.
- **Cross-curricular and real-world application** of scientific knowledge.
- **Problem-solving and critical thinking** promoted through investigations.
- **Collaborative learning** and communication of findings.
- **Integration of digital tools** to support data collection and analysis.

We strive to inspire the scientists of the future by offering aspirational opportunities, including expert visitors, science events, and educational visits. Pupils are introduced to diverse scientific role models and careers, helping them to see the value and possibilities science holds in an ever-changing world.

4 Implementation

At Randlay Primary School, science is taught every week as it is a core subject, and we believe that scientific knowledge must be continuously built upon. We are committed to providing a dynamic and engaging science education that fosters curiosity, critical thinking, and practical skills.

We follow the White Rose Science Scheme of Work, which is designed to help children develop essential scientific knowledge and skills through hands-on tasks, regular practice, and engaging discussions. To ensure coherent and sequenced delivery, we use a two-year rolling programme and a long-term curriculum map overview. This structured approach clearly outlines what is taught and when, and is made accessible to both parents and teachers via links on our website to promote transparency and shared understanding.

To support progression, we use detailed documents derived from the White Rose Science Scheme. These progression documents are used by teachers to inform their planning and are then transformed into Medium Term Plans and PowerPoint presentations for each unit. This allows teachers to plan and deliver lessons that are well-structured, purposeful, and aligned with our overarching curriculum goals.
The White Rose approach ensures that lessons build both substantive knowledge (core scientific concepts) and disciplinary knowledge (scientific methods and processes). Teachers receive regular updates and communications (see Appendix 15.5 for examples), ensuring they are equipped with the skills and resources needed to nurture curiosity, facilitate meaningful practical activities, and effectively teach scientific ideas. This enables us to create a classroom environment where science is interactive, engaging, and thoughtfully guided.

Beyond the classroom, we offer extracurricular activities, trips, and workshops that allow pupils to apply their knowledge in real-world contexts. These experiences help them make meaningful connections between scientific ideas and everyday life. We also promote cross-curricular links with mathematics, design technology, and English, enriching pupils' learning and reinforcing key skills. Events such as Science Week provide further opportunities for pupils to explore science in creative and exciting ways.

Ultimately, we believe that all pupils can achieve high standards in science. By following the White Rose scheme, we ensure a structured and consistent hands-on science education that builds knowledge progressively while fostering a genuine love of learning. Through differentiated activities and opportunities for collaboration, we support all pupils in reaching their full potential and inspire them to continue exploring the world with curiosity and confidence.

5 Cross Curricular Links

At Randlay Primary School, we strive to make science a cross-curricular subject, recognising the value of integrating scientific learning with other areas of the curriculum. By linking science with subjects such as literacy, mathematics, art, geography and history, we help students deepen their understanding and develop a wide range of skills. For example, students explore scientific concepts through reading and writing, collect and analyse data using mathematical skills, and create artwork inspired by natural patterns and processes. They also learn about the environment and climate change through geography and engage with the history of scientific discoveries. This approach not only makes science more relevant and engaging but also encourages critical thinking and problem-solving, allowing students to make connections across disciplines and develop a holistic understanding of the world around them. Through cross-curricular science, we

aim to inspire curiosity, creativity and a love of learning.

6 Extra-Curricular

At Randlay Primary School, we offer a range of extracurricular opportunities to inspire and engage students with science beyond the classroom. Through activities like science clubs (including STEM challenges) and nature and environmental clubs (e.g. forest school and gardening clubs) pupils have the chance to participate in hands-on experiments, explore real-world scientific concepts, and develop their problem-solving skills. We also provide exciting opportunities for field trips, such as visits to local river (water cycle), science museums (National Space Centre in Leicester) and planetariums (National Space Centre in Leicester and ThinkTank), where pupils can learn about the natural world and the universe. These extracurricular activities not only deepen pupils' scientific knowledge but also help them build confidence, critical thinking skills, and a passion for learning that extends well beyond the school day.

7 Differentiation

The teaching of science at Randlay Primary School takes into account the diverse abilities, interests, and individual needs of our students. Science lessons are designed to be flexible and differentiated, ensuring that each child can engage with the content at their own level. If a particular scientific concept or activity is found to be challenging for a child or group, we carefully plan alternative approaches or provide additional support to address their needs. This ensures that all pupils can participate meaningfully in scientific investigations, develop their scientific understanding, and build confidence in applying scientific skills in a supportive and inclusive environment.

8 Key Stages

8.1 EYFS

At Randlay Primary School, our Early Years Foundation Stage (EYFS) curriculum is designed to foster a deep exploration of 'the natural world', allowing children to connect with and understand their environment in meaningful ways. Drawing upon the guidance set out in Birth to 5 Matters and Development Matters, we have created a carefully sequenced cycle curriculum that nurtures curiosity, observation, and inquiry. This curriculum framework ensures that the foundations laid in EYFS are not only aligned with best practices but also provide a solid base for the learning that takes place in Year 1 and beyond. Each block of learning within the EYFS is thoughtfully crafted to build progressively, ensuring that children develop essential skills and knowledge in preparation for their future educational journey.

In our Nursery at Randlay Primary School, we introduce children to Science through the natural world and hands-on exploration (see appendix 15.6). In Nursery 1, children engage with natural materials, observe their surroundings, and begin to understand basic concepts like family, materials, and the environment. They explore water, investigate

everyday objects, and develop early scientific skills through activities such as operating wind-up toys and noticing changes in weather. In Nursery 2, children build on this by learning about the seasons, the life cycles of plants and animals, and simple scientific concepts like magnetism, forces, and material changes. They also gain an awareness of caring for the environment, including recycling, and start identifying animals from different habitats. Through these activities, children develop a sense of curiosity and foundational knowledge that supports their future scientific learning.

Science in our Reception Early Years Foundation Stage (EYFS) focuses on helping children develop a deep understanding of the natural world through the Understanding the World area of learning (see appendix 15.7). In Cycle A, children explore seasonal changes, such as the effects of Autumn, Winter, Spring, and Summer on their environment, as well as basic concepts like plant growth, life cycles, and the characteristics of materials. They engage in hands-on activities like visiting the park to study the woodland, or caring for plants, which helps them connect with nature in meaningful ways. They also learn about forces, light, sound, magnetism, and the properties of materials, alongside practical activities like exploring floating and sinking, and observing reflections. In Cycle B, the focus broadens to include human health and body awareness, alongside further exploration of seasonal changes and environmental issues, such as recycling and ocean conservation. Key activities include learning about minibeasts, electricity, and the impact of different environments on animal life. Through this approach, children build foundational scientific knowledge and skills, preparing them for deeper exploration in later years.

At Randlay Primary School, much of the EYFS Understanding the World curriculum is explored through our "Little Explorers" sessions, which are held during allocated Forest School time. These sessions offer children the opportunity to engage with the natural world in a hands-on, immersive way, fostering curiosity and a deeper connection with their environment. Through Little Explorers, children take part in outdoor activities that promote observation, discovery, and learning about the seasons, plants, animals, and natural materials. The Forest School setting encourages children to explore, question, and learn through play, while also developing their understanding of key concepts such as growth, change, and the natural world around them. This approach not only supports their scientific knowledge but also enhances their physical, social, and emotional development, providing a well-rounded foundation for learning in EYFS.

In the Early Years Foundation Stage (EYFS), assessment is primarily carried out through observations and the Early Learning Goals (EGL). Teachers observe children's interactions, play, and engagement with the learning environment to assess their development and progress. These observations provide valuable insights into children's individual strengths, interests and areas for growth.

The Reception Natural World Early Learning Goal (ELG) (see appendix 15.8) outlines specific expectations for children's understanding of the environment by the end of Reception. Children at the expected level of development will be able to explore the natural world around them, making observations and drawing pictures of animals and plants. They will also demonstrate an understanding of similarities and differences between their environment and contrasting settings, drawing on both their experiences and what has

been taught in class. Additionally, they will show an awareness of important processes and changes in the natural world, including the seasons and the changing states of matter. These observations, aligned with the ELGs, help us track each child's progress and ensure that they are meeting key developmental milestones.

8.2 Key stage 1

At Randlay Primary School, our learning in Key Stage 1 (KS1) is carefully guided by the National Curriculum, ensuring that all children receive a broad and balanced education. To support this, we use the White Rose Scheme, which is fully aligned with the National Curriculum and provides a structured framework for teaching the necessary objectives. This approach ensures a cohesive and progressive learning experience that builds essential skills and knowledge, preparing our pupils for the next stages of their educational journey.

National Curriculum Guidance:

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

8.3 Key stage 2

At Randlay Primary School, our learning in Key Stage 2 (KS2) is guided by the National Curriculum for Science, ensuring a comprehensive and rigorous approach to scientific exploration and discovery. In addition, we follow the White Rose Scheme for Science, which is fully aligned with the National Curriculum objectives and provides a structured and progressive framework for teaching key concepts. This combined approach ensures that our KS2 pupils receive a well-rounded education, building essential knowledge and

skills to prepare them for future academic challenges.

National Curriculum Guidance:

Lower key stage 2 – years 3 and 4

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

Upper key stage 2 – years 5 and 6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

9 Assessment

9.1 Key Questions

At Randlay Primary School, assessment for learning is embedded within every science lesson through the use of a key question that directly links to the lesson objective and National Curriculum expectations. This key question is introduced at the beginning of the lesson and revisited throughout to support discussion, check pupils' understanding and reinforce key scientific concepts. At the end of each lesson, pupils answer the key question as a mini assessment opportunity and a way of consolidating their learning. This enables teachers to identify misconceptions, address any gaps in understanding and adapt future teaching accordingly, ensuring all pupils make progress and develop secure scientific knowledge over time.

9.2 End of Unit Assessments

At the end of each unit, following the White Rose Science Scheme of Work, pupils complete an end-of-unit assessment to consolidate their learning and evaluate their understanding. These assessments are directly linked to the National Curriculum objectives and provide an opportunity to assess whether pupils have met the key learning outcomes for the unit.

The White Rose assessments allow teachers to assess pupils' scientific knowledge and identify both strengths and any gaps in understanding. The outcomes of these assessments are then used to inform future planning, identify areas requiring further teaching and ensure that misconceptions are addressed promptly.

This approach provides a consistent method of assessment across the school and supports the progressive development of pupils' scientific knowledge and understanding, ensuring they are well prepared for subsequent units of learning and the next stage of their scientific education.

10 Cycles A and B:

See Appendix 15.1, 15.2 and 15.3 for each Key Stage Rolling Cycles.

11 Equal Opportunities

At Randlay Primary School and Nursery, we value every pupil and celebrate the diversity that enriches our community. We are committed to inclusivity in science education and believe that all children, regardless of background, deserve equal opportunities to excel. Our science curriculum is carefully planned and regularly reviewed to ensure that all pupils have access to high-quality learning experiences, with no child disadvantaged. This commitment reflects our Equality and Diversity Inclusion Policy, ensuring that every pupil can reach their full potential in science. We also ensure that the scientists we reference, both historical and contemporary, represent a diverse range of backgrounds and cultures, reinforcing our dedication to inclusivity and the celebration of all

contributions to the field of science.

12 Resources

Our central stock cupboard holds the majority of our science resources, which are clearly labelled by unit for easy access. These resources are stored in the corridor outside classrooms B5 and B6.

13 Impact

At Randlay Primary School, the impact of our science curriculum is evident in the enthusiasm and curiosity our pupils demonstrate. From Foundation Stage to Upper Key Stage 2, children engage actively in science. Pupils confidently question and discuss science topics, showing a deep interest in the subject.

Using the White Rose Science Scheme of Work, we ensure a progressive and structured approach to building scientific knowledge and skills. Teachers assess pupils throughout each topic, using KWL grids at the start of each lesson to gauge prior knowledge, and key questions throughout lessons to check understanding and guide learning. At the end of each unit, we assess learning to evaluate pupils' understanding, identify any gaps, and celebrate their progress in both scientific knowledge and practical skills across all year groups.

Standards in science are high at Randlay. The Science Lead Teacher monitors the quality of teaching and pupil progress, providing regular updates.

Overall, the impact of our science curriculum is reflected in pupils' growing curiosity, their ability to think critically, and their strong scientific foundation, preparing them for future challenges and learning.

14 Monitoring and review

The science subject leader will monitor the teaching of science across the school, supporting all teaching staff with updates, resources, and professional development throughout the year. This policy will be reviewed every two years to ensure it remains current and reflects best practice in science education.

15 Appendices

15.1 Key Stage 1 Cycle A and B

Key Stage 1

Cycle A

Autumn 1: **National Curriculum:** Year 1: Seasonal Changes: observe changes across the 4 seasons. Observe and describe weather associated with the seasons and how day length varies. **White Rose:** Three Units: Seasonal Change (See above).

Autumn 2: **National Curriculum:** Year 1: Plants: 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. **White Rose:** Plants (Year 1).

Spring 1: **National Curriculum:** Year 2: Everyday Materials: 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 variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. **White Rose:** Materials (Year 1).

Spring 2: **National Curriculum:** Year 1: Animals including humans: identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **White Rose:** The Human Body (Year 1) and Humans (Year 2).

Summer 1: **National Curriculum:** Year 2: Plants: 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. **White Rose:** Two Units: Plants (Light and Dark) and Plants (Bulbs and Seeds) (Year 2).

Summer 2: **National Curriculum:** Working Scientifically: Working scientifically During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: asking simple questions and recognising that they can be answered in different ways, observing closely, using simple equipment, performing simple tests, identifying and classifying, using their observations and ideas to suggest answers to questions, gathering and recording data to help in answering questions. **White Rose:** Caring for the planet (Year 1).

Key Stage 1

Cycle B

Autumn 1: **National Curriculum:** Year 2: Uses of Everyday Materials: identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **White Rose:** Materials (Year 2).

Autumn 2: **National Curriculum:** Working Scientifically: Working scientifically During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: asking simple questions and recognising that they can be answered in different ways, observing closely, using simple equipment, performing simple tests, identifying and classifying, using their observations and ideas to suggest answers to questions, gathering and recording data to help in answering questions. **White Rose:** Wildlife (Year 2).

Spring 1: **National Curriculum:** Year 2: Animals, including humans: 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. **White Rose:** Two Units: Growing up (Year 2) and Growing and Cooking (Year 1).

Spring 2: **National Curriculum:** Year 2: Living things and their habitats: 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 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. **White Rose:** Animals Need for Survival (Year 2).

Summer 1: **National Curriculum:** Year 1: Animals, including humans: 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). **White Rose:** Animals (Year 1).

Summer 2: **National Curriculum:** Year 2: Living things and their habitats: 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 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. **White Rose:** Living things and their habitats (Year 2).

15.2 Lower Key Stage 2 Cycle A and B

Lower Key Stage 2

Cycle A

Autumn 1: National Curriculum: Year 4: Living things and their habitats: 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. White Rose: Three units: Groups and classify living things, Habitats and Food Chains (Year 4).

Autumn 2: National Curriculum: Year 4: States of Matter: 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 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. White Rose: States of Matter (Year 4).

Spring 1: National Curriculum: Year 4: Sound: 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. White Rose: Sound (Year 4).

Spring 2: National Curriculum: Year 3: Rocks: Describe in simple terms how fossils are formed when things that have lived are trapped within rock. White Rose: Fossils (Year 3).

Summer 1: National Curriculum: Year 3: Plants: 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. White Rose: Two Units: Plants A and B (Year 3).

Summer 2: National Curriculum: Year 3: Animals, including humans: 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. White Rose: Three units: Skeletons, Movement and Nutrition and Diet (Year 3).

Lower Key Stage 2

Cycle B

Autumn 1: National Curriculum: Year 4: Animals, including humans: 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. White Rose: The Digestive System (Year 4).

Autumn 2: National Curriculum: Year 3: Forces and magnets: 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. 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. White Rose: Two units: Forces and Magnets (Year 3).

Spring 1: National Curriculum: Year 3: Light: 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 and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change. White Rose: Light (Year 3).

Spring 2: National Curriculum: Scientific knowledge and conceptual understanding: They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. White Rose: Data collection (Year 4).

Summer 1: National Curriculum: Year 3: Rocks: 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. White Rose: Two units: Rocks and Soils (Year 3).

Summer 2: National Curriculum: Year 4: Electricity: 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 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. White Rose: Electricity (Year 4).

15.3 Upper Key Stage 2 Cycle A and B

Upper Key Stage 2

Cycle A

Autumn 1: **National Curriculum:** Year 5: Earth and Space: 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. **White Rose:** Space (Year 5).

Autumn 2: **National Curriculum:** Year 5: Forces: 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 levers, pulleys and gears allow a smaller force to have a greater effect. **White Rose:** Forces (Year 5).

Spring 1: **National Curriculum:** Year 6: Light: 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 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. **White Rose:** Light (Year 6) and Light Pollution (Year 6).

Spring 2: **National Curriculum:** Year 6: Electricity: 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. Use recognised symbols when representing a simple circuit in a diagram. **White Rose:** Electricity (Year 6).

Summer 1: **National Curriculum:** Year 6: Animals, including humans: 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. **White Rose:** Circulatory System and Diet, Drugs and Lifestyle (Year 6).

Summer 2: **National Curriculum:** Year 5: Animals, including humans: Describe the changes as humans develop to old age. **White Rose:** Reproduction A and Reproduction B (Year 5).

Upper Key Stage 2

Cycle B

Autumn 1: **National Curriculum:** Year 5: Properties and Materials: 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 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. **White Rose:** Properties of Materials (Year 5).

Autumn 2: **National Curriculum:** Year 5: Properties and Materials: 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 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. **White Rose:** Reversible and Irreversible Changes (Year 5).

Spring 1: **National Curriculum:** Year 6: Living things and their habitats: Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics. **White Rose:** Living things and their habitats (Year 6).

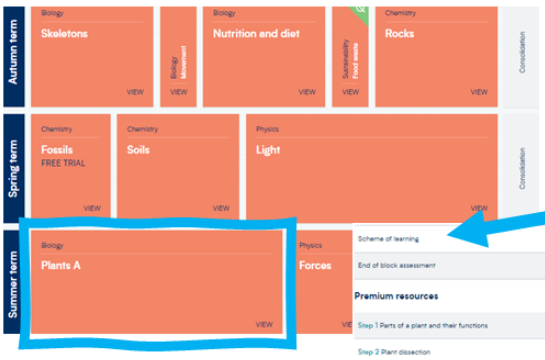
Spring 2: **National Curriculum:** Year 5: Living things and their habitats: describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
describe the life process of reproduction in some plants and animals. **White Rose:** Lifecycles (Year 5).

Summer 1: **National Curriculum:** Year 5: Animals, including humans: describe the changes as humans develop to old age. **White Rose:** Animals including humans (Year 5).

Summer 2: **National Curriculum:** Year 5: Evolution and inheritance: 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. **White Rose:** Variation, Adaptations and Fossils (Year 6).

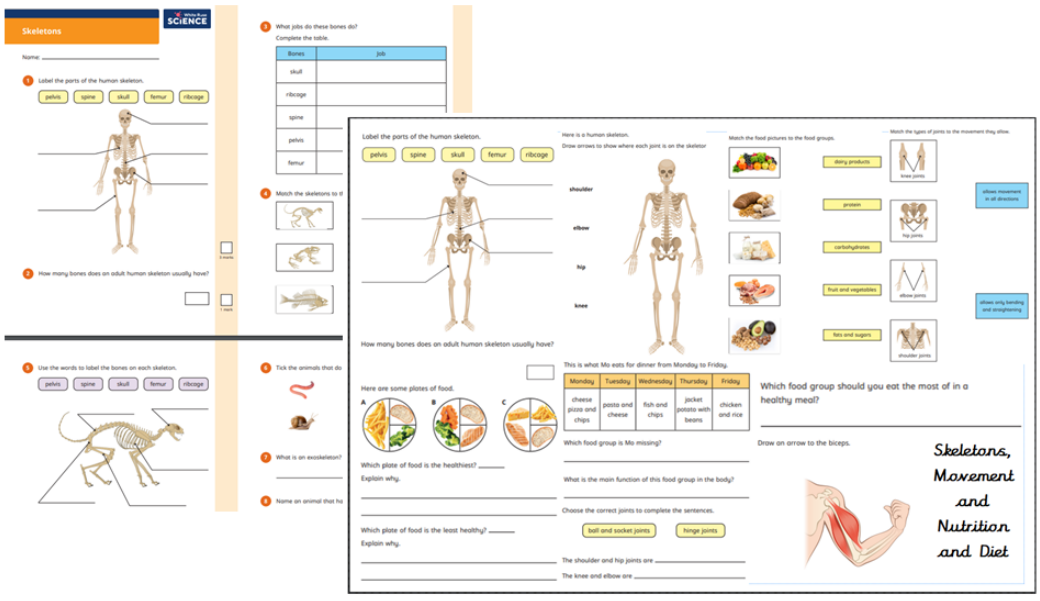
Example

This is how we used the White Rose materials to plan our Year 3 unit on Plants.



We have access to the write on worksheets (for most of the units) however, these can be a bit wishy-washy, so we opted to mainly just work from the Scheme of Learning…

The unit assessments will be very helpful for us as this was the main target following the PSQM award. They are set up like our start and end of unit assessments for maths. The assessment sheets look just like our Maths ones. You can choose whether to print it like this and do one at the start and end or adapt it like I had to (mainly because we were covering two units).



The Planning Document

Although the resources are there, like with the Maths, I think we should use the planning document and steps rather than default to sheets.

Step 1	Name and identify bones in the human body
Step 2	Functions of the skeleton
Step 3	Name and identify bones in a range of animals
Step 4	Animals with and without a spine
Step 5	Are all skeletons the same?

I found the planning document very helpful as it gives you the breakdown of steps linked to the National Curriculum so we will be in line with the objectives we need to hit across our rolling program.

Year 3 | Autumn term | Block 1 – Skeletons | Step 1

Name and identify bones in the human body

White Rose SCIENCE

Notes and guidance

In this small step, children explore the human skeleton for the first time by naming and identifying bones. There are lots of bones in the human skeleton, many of which have complex names. The focus of this small step is on the skull, femur, pelvis, spine and ribcage. By the end of this step, children should be able to name, identify and locate these bones in the human body.

The enquiry question for this block is "How can we sort and group animals based on their skeletons?" This is an identifying, grouping and classifying enquiry. Within this step, children can create relevant questions to begin the enquiry process.

Key questions

- How many bones are there in the human skeleton?
- Where is the skull found in the skeleton?
- Where is the femur found?
- Where is the pelvis found in the skeleton?
- Where is the ribcage found?
- Where is the spine found in the skeleton?

Enquiry question

- How can we sort and group animals based on their skeletons?

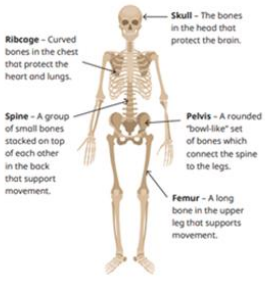
Things to look out for

- Children may think that the skeleton is one large bone, rather than a collection of bones.
- They may believe that bones in the body do not have specific names, for example, they may think all bones in the leg are called "leg bones".
- Children may think that the arms and legs are one long bone, rather than made up of multiple bones.

National curriculum links

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- **Working scientifically** – Asking relevant questions and using different types of scientific enquiries to answer them.

Key vocabulary



After the initial introduction page, they then give you ideas for activities in order to achieve that objective. There is a key vocab page which would be good for PPG pre-teaching and to be used as knowledge organiser for children to use.

I used the majority of the practical ideas and activities given for each objective and adapted them to fit our setting.

Practical ideas

- Children could work in pairs to draw around the outline of their partner's body on large sheets of paper. Children can then correctly identify and label the locations of the bones learnt in Step 1

skull | ribcage | femur | pelvis | spine

They should then describe the functions of each of the bones. (Note: If drawing round a partner's body is not appropriate, a printed outline could be used.)

The Planning

Year 3 | Summer term | Block 1 – Plants A | Step 2

Plant dissection

Notes and guidance

In this small step, children apply their knowledge of plant parts from the previous step and complete a plant dissection. When dissecting, children should carefully cut and observe the different parts of a plant including the roots, leaves, stem and flowers.

Children should have the opportunity to dissect a range of plants and identify the different parts and their functions. They can apply their knowledge of plant parts and note the differences in the structures between various plants.

To extend learning, children can sort and group the structures in different ways. This could be by appearance or by making comparisons between the functions of different parts of the plant.

Things to look out for

- Children may think that the stems, leaves and flowers of different plants all look the same. Clarify to them that different plants will have different-sized stems, leaves and flowers, and will also have different appearances.
- Classroom scissors should be used to complete the dissection. Children should also wash their hands after handling plants.

Key questions

- Where are the leaves?
- Where are the flowers?
- What is the function of the roots?
- What is the function of the stem?
- What are the functions of the leaves and flowers?
- What do you notice about all of the roots/stems/leaves/flowers?
- What does "dissection" mean?
- What patterns can you spot between all the _____?

National curriculum links

- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
- **Working scientifically** – Talk about criteria for grouping, sorting and classifying (non-statutory).

Year 3 | Summer term | Block 1 – Plants A | Step 2

Plant dissection

Key vocabulary

- **leaf** – absorbs sunlight to make food for the plant
- **stem** – carries water to different parts of the plant and holds the plant upright
- **roots** – absorb water and nutrients from the soil and hold the plant in place
- **flower** – helps the plant to reproduce and create new life
- **dissection** – the method of separating something into its parts

Practical ideas

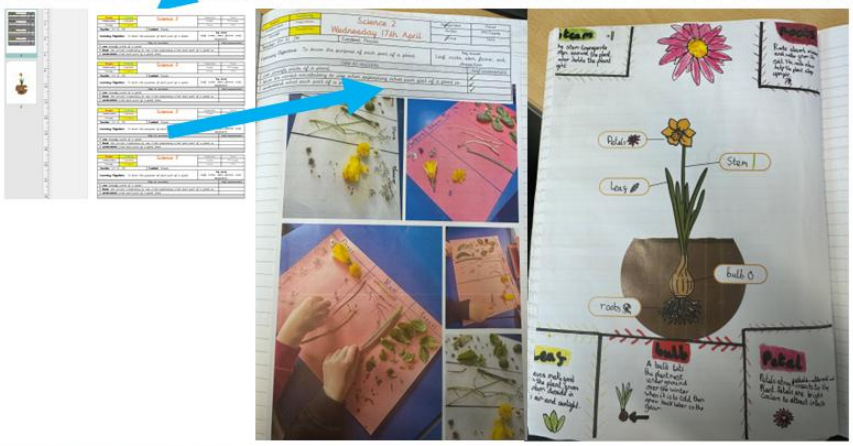
- Provide children with real-life examples of different flowering plants. Ask children to dissect the plants and group them into their different parts.

  Encourage children to label the parts and describe their functions. Children can then note the similarities and differences between the parts.

Factual knowledge

- A dissection is the method of separating something into its parts.
- The roots absorb water from the soil and hold the plant in place.
- The stem carries water to different parts of the plant.
- The leaves absorb sunlight to make food for the plant.
- The flowers help the plant to reproduce and create new life.

2	To know the purpose of each part of a plant	Leaf, roots, stem, flower, soil, dissection	Flowers (maybe 5 different types) A3 sugar paper A3 print out Post-it notes (various colours)	**Plant Dissection** **National Curriculum Links:** • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • Working scientifically – Talk about criteria for grouping, sorting and classifying (non-statutory). **Notes and Guidance:** In this small step, children apply their knowledge of plant parts from the previous step and complete a plant dissection. When dissecting, children should carefully cut and observe the different parts of a plant including the roots, leaves, stem and flowers. Children should have the opportunity to dissect a range of plants and identify the different parts and their functions. They can apply their knowledge of plant parts and note the differences in the structures between various plants. To extend learning, children can sort and group the structures in different ways. This could be by appearance or by making comparisons between the functions of different parts of the plant. **Key Question:** What are the functions of the leaves and flowers? **Activity 1:** Provide children with real-life examples of different flowering plants. Ask children to dissect the plants and group them into their different parts. They could do this in groups on A3 sugar paper (with the 4 categories shown below). Take a photo of this for books (stick in under SC).  Chn to then use post-it notes to identify similarities and differences. **Activity 2:** Next, in partners, give chn image of a plant (with labels of the parts already on). Give chn a post-it notes to label what they think that part does (hypothesis). Using the PPT explain what each part of a plant does. Then, give them a different coloured post-it notes to write down the correct function of each part of the plant. Photocopy for books.



Here is an example of how I took the practical idea, adapted it within our planning and then made the resources to teach it.

15.6 Nursery 1 and 2 Curriculum

Nursery 1:

Understanding the World						
	➢ I can explore natural materials inside and out. ➢ I can operate mechanical toys, e.g. turns a knob on a wind-up toy. ➢ I know who my immediate family, relations and pets are.	➢ I can explore materials with different properties. ➢ I can play with water to investigate "low technology" such as washing and cleaning.	➢ I notice detailed features of objects in my environment. ➢ I seek to acquire basic skills in turning on and operating some digital equipment.	➢ I explore and respond to different natural phenomena in my setting and on trips. ➢ I am beginning to talk about some of the things I have observed such as plants, animals, natural and found objects.	➢ I can make connections between the features of my family and other families. ➢ I know how to use pipes, funnels and other tools to transport water from one place to another. ➢ In pretend play, I am beginning to imitate everyday actions and events from my family and cultural background.	➢ I notice differences between people. ➢ I enjoy playing with small world reconstructions building on first-hand experiences e.g. visiting farms, garages, train tracks. ➢ I am learning that I have similarities and differences that connect me to, and distinguish me from, others. ➢ I know the routine of the Nursery session. ➢ I know our days of the week song. ➢ I can make observations about the daily weather.

Nursery 2:

Understanding the World							
Science	**Cycle A**	I know who makes up my family. I know I was once a baby.	I know that Autumn is one of the seasons. I know some of the things that happen in Autumn e.g. hibernation. CC-Visit to Town Park	I know that Winter follows Autumn. I know some of the things that happen in Winter e.g. Ice I know there are different light and sound sources. I know how to operate simple equipment and can say how it works.	I know that Spring follows Winter. I know some of the things that happen in Spring e.g. new life I know the key features of the life cycle of a plant. I know about some changes to materials (chocolate). CC-Visit to garden centre/allotment	I know that some materials are attracted to magnets. I know that different materials are reflective. I know that some objects float and some sink.	I know that Summer follows Spring. I know some of the things that happen in Summer e.g. hot weather I know that I must look after my environment. I know what recycling is. I know the names of some sea creatures.
	Cycle B	I know who makes up my family. I know I was once a baby.	I know that Autumn is one of the seasons. I know some of the things that happen in Autumn e.g. hibernation. I can explore and talk about different forces I can feel.	I know that Winter follows Autumn. I know some of the things that happen in Winter e.g. Ice I know that materials can be changed by heating and cooling- popcorn, wax crayons, blocks of ice, ice cubes, bread. I can explore a range of natural materials in a sensory way-dew, ice, icicles, frost.	I know that Spring follows Winter. I know some of the things that happen in Spring e.g. new life I know the key features of the life cycle of a minibeast-butterfly. I know the names of some different minibeasts.	I know that some things are powered by electricity. I can talk about what electrical devices do e.g. make light, move, make a sound.	I know that Summer follows Spring. I know some of the things that happen in Summer e.g. hot weather I know the names of a range of different animals. I know and name animals from different habitats- jungle, polar, desert. I know how animals are cared for when they live outside their natural environment.

15.7 Reception Curriculum

Understanding the World							
Science	**Cycle A**	I know ways I have changed since I was a baby. I know the names of baby animals.	I know the effect of Autumn on the natural world around me. I know the names of features of the woodland- trees, branches, trunk, leaves, plants, grass, stones, twigs, conkers, pinecones, acorns. CC-Visit to Town Park.	I know the effect of Winter on the natural world around them. I know there are different light and sound sources. I know that light and sound sources can be blocked- shadows, muffling.	I know the effect of Spring on the natural world around them. I know how to care for growing plants. I know about the life cycles of a bean. I know the names of the basic parts of a flowering plant. I know that plants need water, light and warmth to grow. CC-Visit to garden centre/allotments.	I can explore magnetism and know that some materials are attracted and repelled by magnets. I can explore mirrors and reflections and know that some materials are reflective. I can explore floating and sinking and know that some materials float and some sink.	I know the effect of Summer on the natural world around them. I know that humans can take action to help keep our natural environment safe and clean, including recycling- know about keeping our oceans clean. I know and name animals from an ocean habitat. I know that some things are man-made and some are natural.
	Cycle B	I know the names of parts of my body and what they do. I know that sleep, food and hygiene are important for my health. I know the effect of exercise on my body.	I know the effect of Autumn on the natural world around me. I know that there are different forces. I know that forces can make things move, slow down and stop. I can explore and talk about different forces they can feel. CC-Steam railway	I know the effect of Winter on the natural world around me. I know and name a range of materials. I know that materials can be changed by heating and cooling. I can explore how materials change-popcorn, wax crayons, blocks of ice, ice cubes, bread.	I know the effect of Spring on the natural world around me. I know the names of different minibeasts. I know about the life cycles of a butterfly. I can draw pictures of minibeasts. I can observe minibeasts closely and identify them.	I know that some things are powered by electricity. I know that some things are powered by mains electricity and some by batteries. I can talk about what electrical devices do e.g. make light, move, make a sound. I know that electricity can be dangerous. CC-Blist's Hill visit- time before electricity.	I know the effect of Summer on the natural world around me. I know that some environments are different to the ones in which they live. I know and name a range of different animals from different habitats. I can describe animals from different habitats-jungle, polar, desert. I know how animals are cared for when they live outside their natural environment.

15.8 EYFS Natural World ELG

The Natural World ELG Children at the expected level of development will: - Explore the natural world around them, making observations and drawing pictures of animals and plants; - Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.