Oakham Primary School

Science Policy and Curriculum

Approved by Governors on:	**08/05/24**
Signature of Chair of Governors:	
Lead Personnel:	**J Kettle**
Date to be reviewed:	**08/05/26**

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.

Our Vision

We encourage our children to be inquisitive and we want them to be equipped with the knowledge base and scientific skills required to understand the uses and implications of science, today and for the future. A strong emphasis is placed on developing independent and thoughtful learners who are resilient, curious and enjoy the challenges offered by our science curriculum.

Throughout the programme of study, the children will acquire and develop the key knowledge and vocabulary identified within each year group, as well as the application of specific scientific skills, in a way that facilitates their confident, active participation in enquiry at a level appropriate to their stage of development.

Intent

To develop children's substantive knowledge and disciplinary skills of science, inspiring and igniting curiosity about the processes and methods and how it helps to shape the future. This will be achieved by supporting the children:

- To be curious and ask questions about science and to interpret their findings
- To use scientific evidence to explain and justify their explanations and judgements
- To progressively acquire a sound understanding of key scientific knowledge and concepts and effectively recall these to support new learning.
- To be able to apply scientific skills when undertaking practical work, both individually and collaboratively.
- To use a wide range of scientific skills to be able to reason and solve problems.
- To research significant scientists and figures and to understand their impact.

Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills. We will ensure that there are frequent opportunities to 'Think like a Scientist' and 'work scientifically.'

These concepts skills are built-on and developed throughout children's time at the school so that they can apply their knowledge of science when using equipment, conducting experiments, explaining concepts confidently and continue to ask questions and be curious about our world.

Implementation

We use the Development Matters and National Curriculum documents to inform the delivery of science at. Science is taught discretely following the units as set out in the National Curriculum; through resources, materials and planning from 'HeadStart Science' and 'Outstanding Science.'

Our progression documents show a progressive journey of knowledge and skills across the following phases:

EYFS - In the Early Years science content is delivered through the 'Understanding the World' strand of the EYFS curriculum. This involves guiding children to make sense of the natural world around them through opportunities to explore and look closely, use equipment and tools safely, question why things happen and test ideas. Pupils should develop an awareness of science through hands on experiences and observations. They are assessed according to the Development Matters outcomes and Early Learning Goals.

Key Stage 1 & 2

We have carefully designed a comprehensive Science curriculum that aligns with the National Curriculum, encompassing biology, chemistry, physics, and scientific enquiry. Our curriculum is sequenced in a way that builds knowledge and skills progressively; ensuring children can make connections between topics and deepen their understanding over time. Through our planning, we involve problem solving opportunities that allow children to apply their knowledge, and find out answers for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge.

Teachers use precise questioning in class to test conceptual knowledge and skills, and assess pupils regularly to identify those children with gaps in learning, so that all pupils keep up. We build upon the knowledge and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.

Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching.

Impact

Our pupils apply their scientific knowledge and skills confidently, demonstrating an understanding of the scientific method and the ability to think critically. They display a passion for Science and are actively engaged in their learning; actively participating in practical activities, asking insightful questions, and effectively connecting prior and new learning to the world around them.

Our children acquire a sound understanding of key scientific knowledge, concepts and skills, including the ability to interpret and analyse scientific information. They can discuss and communicate scientific ideas confidently, both in oral and written form. Through, experimentation, and problem-solving, our children develop independence in their scientific thinking and can apply their knowledge and skills to make informed decisions.

Scientific Knowledge and Conceptual Understanding

The programs of study in the 2014 Primary National Curriculum describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage.

Pupils should:

- Be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely.
- Build up an extended scientific vocabulary.
- Apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data.

'Working scientifically' specifies the understanding of the nature, processes and methods of Science for each year group and this is embedded within lessons and focuses on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

These types of scientific enquiry include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils are given opportunity to seek answers to questions through collecting, analysing and presenting data.

Assessment

Children's progress is continually monitored throughout their time at Oakham Primary School and is used to inform future teaching and learning. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum. These are set out as statutory requirements.

Children receive effective feedback through teacher assessment, both orally and through marking in line with the school policy. Assessment for learning is continuous throughout the planning, teaching and learning cycle. The assessment of individual lessons is recorded through a 'colour' and any necessary feedback is provided.

When a unit has been taught, each child completes a summative assessment that revisits and assesses an area of prior learning. A triangulation of the assessment score, the progress in the books and the contributions of the individual in lessons is used to award an overall 'colour', where they will either be working towards the expected level, working at the expected level or working at greater depth.

Sticky Knowledge & Retrieval Practice

All science units are planned and sequenced to support and facilitate new knowledge and skills are built on what has been taught before. Teachers have identified crucial content that they want our children to remember long term which is needed for their subsequent learning; this is 'Sticky Knowledge'.

Learning is carefully planned with clear and coherent learning sequences that progress towards clearly defined end points. Regular opportunities are used in lessons to check that children are learning the key objectives and vocabulary, along with opportunities for children to revisit and refresh what they have been taught after a period of time has passed.

Lessons will begin with a recall of previous key learning and vocabulary to support this becoming embedded in the long term memory. This process of retrieval helps to embed learning and, in this way, new knowledge and skills build on what has been taught before, enabling children to 'remember more'.

'Thinking like a Scientist'

Children are challenged to 'Think like Scientist' in lessons, guided by slides that facilitate quick recall of previous knowledge, identify a specific related science skill and a key question linked to the main learning outcome of the session (Appendix A). Every session also begins with a quick recall of previous learning using 'Retrieval Practice' principles and key scientific concepts and vocabulary also feature in weekly, 'Flashback Friday' morning tasks.

Knowledge Organisers – Classroom Display

Children identify what they know already about each topic, as well as what they would like to know. The programme of study is responsive to the children's starting points, as well as their specific interests. In addition to 'what we know already', each knowledge organiser will feature: 'key vocabulary', 'key images, 'what I have learnt' (examples of independent learning, and 'questions I have?' (Appendix B). The knowledge organised is collaborative and builds as the unit progresses. Each child's book has a colour copy of the class's knowledge organiser in the book to complete each science unit.

EYFS

During the Foundation Stage, Science skills and knowledge are taught both directly and indirectly through the 'Understanding the World', 'Communication and Language' and 'Personal, Social and Emotional Development' Early Learning Goals in the EYFS curriculum. Throughout their time in EYFS, Our practitioners guide pupils in working scientifically through exploration, observations and real-life experiences. Through these, pupils gain insight of people, places, technology and the environment and begin to make logic of the world around them.

Practitioners frequently assess all children against the Development Matters statements, the Early Learning Goal and Exceeding descriptors through focused activities and observations of their play and exploration; progress is evidenced in their Learning Journals.

At the end of each term, professional discussions are held with the EYFS team to discuss and review pupil progress. This enables staff to identify every child's progress with their early Science skills, and enable staff to plan and develop scientific inquiry and skills into each topic. This ensures pupils are making progress towards meeting the 'Understanding the World' Early Learning Goal at the end of the summer term.

Inclusion & SEND

All children are encouraged and supported to develop their full potential in Science. Some children may require extra support in the classroom (from a designated adult) and opportunities for consolidation and reinforcement. We have implemented a co-operative learning approach, especially in Science. This co-operative learning structure aims to enhance all children's learning through peer collaborative learning and quality first wave teaching. This will enable children with learning and/or physical difficulties to take an active part in scientific learning and practical activities and investigations and to achieve the goals they have been set.

Teachers will differentiate learning activities to match the in-needs of children with SEND using alternative resources, additional materials/supplementary materials, and adaptations to the main task or activity. These may follow recommendations made by Sandwell Inclusion Support and the Oakham Inclusion Manager.

Children who complete the majority of their independent learning in the school **S**tructured **L**earning **E**nvironments, will complete tasks and activities from 'Sensory Science'. Evidence of independent and collaborative learning is collated in pupil EYFS Learning Journeys or KS1/2 Science Books.

By being given enhancing and enriching activities, more able children will be able to progress to a higher level of knowledge and understanding appropriate to their abilities.

Oakham Primary Science Curriculum Overview

Our whole school science progression documents cover the following areas:

- Core scientific knowledge and concepts related to each unit
- Working scientifically strands
- Key vocabulary to be used during each science unit

Science Topics & Links Overview (EYFS, KS1 & KS2)			
N	Nursery Rhymes All about Me & Places to visit	People who help us & Animals	Traditional Tales & Fantasy
R	All About Me Seasons & Christmas	Fantasy & People Who Help Us	Local Area (Compare to the world) & Growth
Year 1		**Year 2**	**Year 3**
• Plants • Animals, Including Humans • Materials • Seasonal Changes		• Living Things & Their Habitats • Plants • Animals, Including Humans • Materials	• Plants • Animals, Including Humans • Materials • Light • Forces and Magnets
Year 4		**Year 5**	**Year 6**
• Living Things & Their Habitats • Animals, Including Humans • Materials • Sound • Electricity		• Living Things & Their Habitats • Animals, Including Humans • Materials • Forces and Magnets • Earth and Space	• Living Things & Their Habitats • Animals, Including Humans • Light • Electricity • Evolution and Inheritance

Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Materials	Animals, Including Humans			Plants	Seasons & Weather
Year 2	Materials	Animals, Including Humans		Living Things & Their Habitats		Plants
Year 3	Plants *(How Plants Grow)*	Light	Animals, Including Humans	Forces & Magnets	Materials *(Rocks & Soils)*	
Year 4	Animals, Including Humans *(Teeth & Digestion)*	Sound	Living Things & Their Habitats *(Food Chains)*	Materials	Electricity	
Year 5	Forces & Magnets *(Forces)*	Earth & Space	Living Things & Their Habitats	Animals, Including Humans	Materials	
Year 6	Light	Animals, Including Humans *(Healthy Living)*	Evolution & Inheritance	Electricity	Living Things & Their Habitats *(Animal Classification)*	

Science in Early Years Foundation Stage		
Nursery	**Communication and Language**	Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
	Personal, Social and Emotional Development	Make healthy choices about food, drink, activity and tooth brushing.
	Understanding the World	Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see using a wide vocabulary. Begin to make sense of their own life-story and family's history. Explore how things work. Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice.
Reception	**Communication and Language**	Learn new vocabulary. Ask questions to find out more and to check what has been said to them. Articulate their ideas and thoughts in well-formed sentences. Describe events in some detail. Use talk to help work out problems and organise thinking and activities and to explain how things work and why they might happen. Use new vocabulary in different contexts.
	Personal, Social and Emotional Development	Know and talk about the different factors that support their overall health and wellbeing: ▪ regular physical activity ▪ healthy eating ▪ tooth brushing ▪ sensible amounts of 'screen time' ▪ having a good sleep routine ▪ being a safe pedestrian
	Understanding the World	Explore the natural world around them. Describe what they see, hear and feel while they are outside. Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them
Early Learning Goals	**Communication and Language**	Make comments about what they have heard and ask questions to clarify their understanding
	Personal, Social and Emotional Development	Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices
	Understanding the World	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

Curriculum Skills – KS1 & KS2

Year 1 and 2

- 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

Year 3 and 4

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labeled diagrams, keys, bar charts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings.

Year 5 and 6

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

Science Skills are evidenced using the Oakham Science Skill Log (Appendix C)

Living Things & Their Habitats

Year Group	Statutory Requirements	Working Scientifically
1	N/A	N/A
2	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	Sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. Describe how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. Construct a simple food chain that includes humans (e.g. grass, cow, human). Describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there.
3	N/A	N/A
4	Recognize that animals and plants can be grouped in a variety of ways Explore and use classification keys to help group, identify and name a variety of animals and plants in their local and wider environment Recognize that environments can change and that this can sometimes pose dangers to animals and plants.	Using and making simple guides or keys to explore and identify local plants and animals Making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.
5	Describe the differences in the life cycles of animals: mammals, amphibians, insects and birds Describe the life process of reproduction in some plants and animals	Observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world Try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.
6	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	Using classification systems and keys to identify some animals and plants in the immediate environment. Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Plants

Year Group	Statutory Requirements	Working Scientifically
1	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.	Observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants Describing how they were able to identify and group plants, and drawing diagrams showing the parts of different plants including trees. Keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.
2	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	Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb. Observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy.
3	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	Comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertilizer Discovering how seeds are formed by observing the different stages of plant life cycles over a period of time. Looking for patterns in the structure of fruits that relate to how the seeds are dispersed. Observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.
4 - 6	N/A	N/A

Earth and Space

Year Group	Statutory Requirements	Working Scientifically
1 -4	N/A	N/A
5	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.	Comparing the time of day at different places on the Earth through internet links and direct communication Creating simple models of the solar system Constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day Finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.
6	N/A	N/A

Animals, Including Humans

Year Group	Statutory Requirements	Working Scientifically
1	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Using their observations to compare and contrast animals at first hand or through videos and photographs Describing how they identify and group them according to what they eat. Using their senses to compare different textures, sounds and smells.
2	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 amount of different types of foods and hygiene	Observing, through video or first-hand observation and measurement, how different animals, including humans, grow. Asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.
3	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	Identifying and grouping animals with and without skeletons; observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons.cv Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. Research different food groups and how they keep healthy and design meals based on what they find out.
4	Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions Construct and interpret a variety of animal food chains, identifying producers, predators and prey	Pupils might work scientifically by: comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.
5	Describe the changes as humans develop to old age	Researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows
6	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 human bodies function Describe the ways in which nutrients and water are transported within animals, including humans	Exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Materials

Year Group	Statutory Requirements	Working Scientifically
1	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.	Performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?'
2	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, brick, rock, paper and cardboard for particular uses Find out how the shape of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs) Observing closely, identifying and classifying the uses of different materials, and recording their observations.
3	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	Observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time Using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water.
4	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	Grouping and classifying a variety of different materials Exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line.
5	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity, and response to magnets	Carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?'

	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	Compare materials in order to make a switch in a circuit. Observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. Research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.
6	N/A	N/A

Seasonal Changes

Year Group	Statutory Requirements	Working Scientifically
1	Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies.	Making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change.
2 -6	N/A	N/A

Light

Year Group	Statutory Requirements	Working Scientifically
1 & 2	N/A	N/A
3	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 a solid object Find patterns in the way that the size of shadows change	Looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.
4 & 5	N/A	N/A
6	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	Deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works.

	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	Investigate the relationship between light sources, objects and shadows by using shadow puppets. Extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

Forces and Magnets

Year Group	Statutory Requirements	Working Scientifically
1 & 2	N/A	N/A
3	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	Comparing how different things move and grouping them Raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions Exploring the strengths of different magnets and finding a fair way to compare them Sorting materials into those that are magnetic and those that are not Looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another Identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.
4	N/A	N/A
5	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	Exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. Explore resistance in water by making and testing boats of different shapes. Design and make products that use levers, pulleys, gears and/or springs and explore their effects.
6	N/A	N/A

Evolution and Inheritance

Year Group	Statutory Requirements	Working Scientifically
1 - 5	N/A	N/A
6	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	Observing and raising questions about local animals and how they are adapted to their environment Comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. Analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

Sound

Year Group	Statutory Requirements	Working Scientifically
1 - 3	N/A	N/A
4	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	Finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. Make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. Make and play their own instruments by using what they have found out about pitch and volume.
5 & 6	N/A	N/A

Electricity

Year Group	Statutory Requirements	Working Scientifically
1 - 3	N/A	N/A
4	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	Observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.
5	N/A	N/A
6	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	Systematically identifying the effect of changing one component at a time in a circuit Designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

Online Resources

A variety of additional online resources are recommended to support the delivery and extension of our scientific programme of study:

https://www.bbc.com/teach/terrific-scientific

https://bpes.bp.com/resources/list

https://www.natgeokids.com/uk/category/discover/science/

https://www.britishscienceweek.org/

https://explorify.wellcome.ac.uk/en/activities

https://faraday-primary.theiet.org/resource-listing/

Appendix A – Standard Oakham Primary – Thinking like a Scientist' Lesson slide

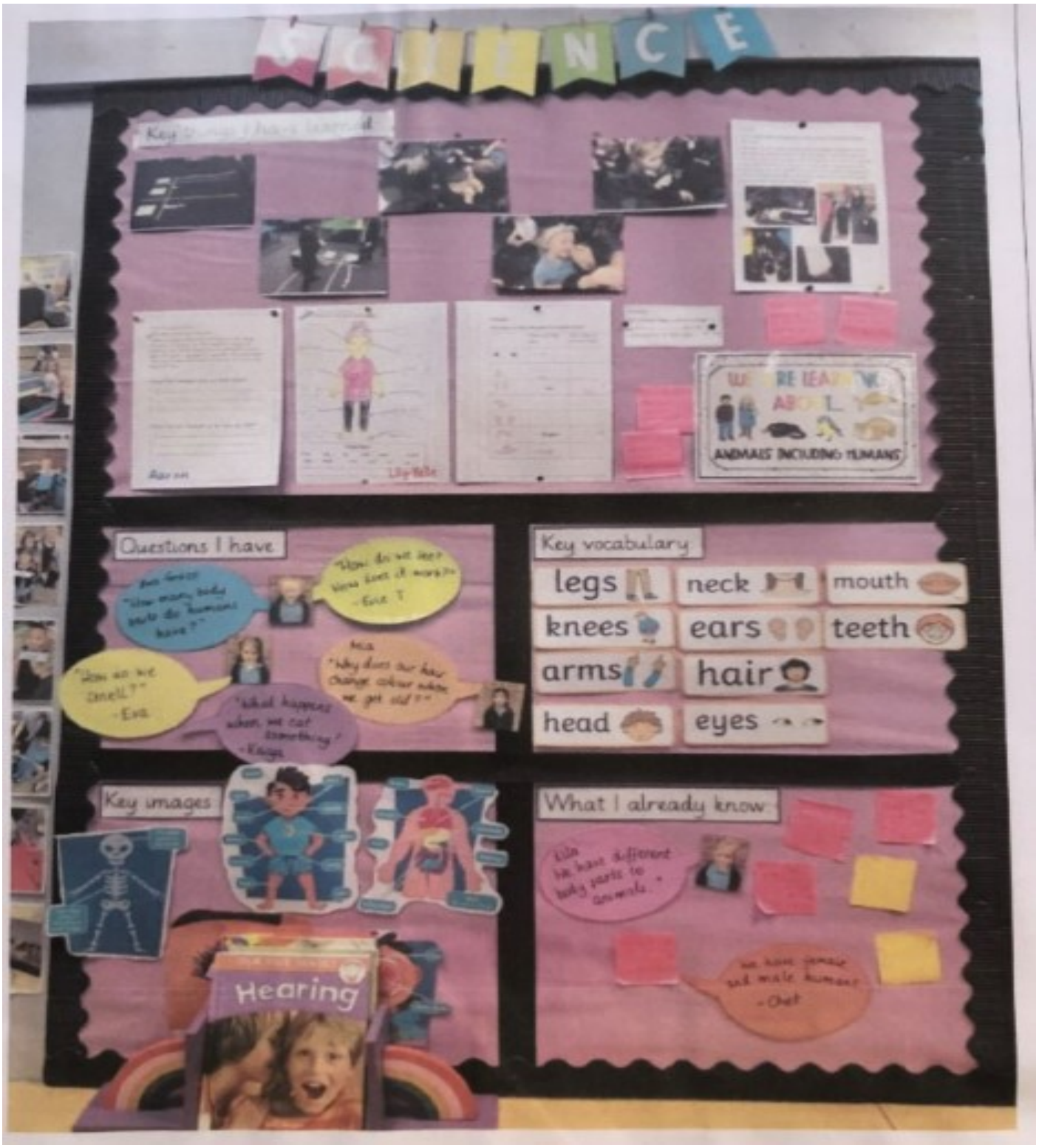
Thinking like a scientist

Take a close look at the image – what do you think is happening?

The Skill

Reporting and presenting findings from enquiries

Appendix B – Science Knowledge Organiser



Appendix C – Sample Science Skills Evidence Log

Curriculum Skill *(Year 1 & 2)*	**Date Evidenced**									
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.										