What makes me a scientist?

Lambley Primary School

Be ready, respectful and resilient

Lambley Primary School: Science subject audit

Date	1	2	3	4
1 :immediate action needed– add to action plan, 2: underdeveloped, 3: planned and beginning to be embedded (time is needed to fully embed), 4: fully embedded in my subject				
Quality of Education				
Intent				
Does your subject reflect a coherent rationale for the school's broad and balanced curriculum?				x
Is there a carefully sequenced progression of Science knowledge/concepts/skills to end of KS1/2				x
Does your unique Science curriculum meet your pupils' needs & meet N.C standards?				X
Curriculum coverage allows all pupils to access content & make progress			X	
Clear identified targets are shown through the Curriculum Development plan			X	
Implementation				
Teachers can explain what children learn/why it's important in your subject's curriculum			X	
Subject leader's review / quality assure LTP and Unit Plans and check against in book looks to ensure implantation of intent			X	
Teachers understand what the depth of knowledge expected is at the end of every unit / year through knowledge organisers			X	
Subject leaders show knowledge and expertise to design, support and deliver the curriculum through the development of knowledge organisers and support given to teachers			X	
Book looks, working walls, pupil voice and school trips, show that your subjects' curriculum is implemented fully			X	
Teachers organise and sequence learning appropriately – shown in unit plans and LTPs				X
There are opportunities for CPD support to upskill teachers in knowledge and skills for your subject			X	
Subject leaders, teachers and pupils are clear on how units are assessed and how progress is shown			X	
Differentiation is appropriate to enhance all pupils' capacity to access the full curriculum			X	
Use of the locality are maximized to provide first-hand experience within your subject.		X		
Pupils use appropriate resources for your subject to build knowledge and skills		X		
Clear understanding of what progression looks like in and across each year group – progression of vocabulary is explicit			X	
Opportunities for all staff to moderate/ share / feedback on work			X	
Impact				
Pupils have embedded and retained fluent knowledge in your subject's knowledge, skills and vocabulary (in and across years)			X	
Children have progressed in different strands of your subject and this is clear from book look and pupil voice			X	
Subject books show children voice, learning and progress through examples of work, images etc			X	

Why is Science important at our school? (Vision Statement)

Intent:

Through our practical and enjoyable curriculum, we aim to inspire and excite our children and foster a thirst for knowledge. We believe that these opportunities will ensure that our children are confident, life-long learners who will explore science around them. Science and Engineering are rapidly growing and important industries in the modern world. Even if children do not become scientists or engineers, they will grow up in a world that requires scientific literacy and critical thinking skills. Science is all around us and helps children to make sense of the world.

Implementation:

Lambley Primary School aspires to provide excellent opportunities for science so that children can:
- Make meaningful links between classroom learning and the real world in order to develop their understanding of Science
- Develop scientific literacy and critical thinking skills by designing and carrying out their own investigations
- Make excellent progress

In order for the above principles to be achieved, we will:
- Provide teachers with opportunities to further develop their subject knowledge
- Provide opportunities for children to ask their own questions, experiment and plan their own investigations, giving them the support they need to be able to develop scientific skills.

Reading across the curriculum:

As a school we actively encourage the use of research to develop our curiosity for the world around us and to provide questions to build on our understanding. Where possible we enjoy reading and sharing non-fiction texts and provide umbrella questions for home learning opportunities. We use Ninja warrior comprehension books where possible to encourage cross curricular reading with science-based comprehension or inference activities

Impact:

At Lambley Primary School we recognise the importance of Science and strive to maintain a high profile for the subject within our school. A scientist observes, questions, creates hypotheses, experiments, records data, and then analyses that data. All children can be scientists by following their own natural curiosity and at Lambley Primary School, teachers help to facilitate these skills in order for children to flourish

Science: Unit by Unit

At Lambley Primary School, we have our own bespoke, unique curriculum that prioritises progression, 'sticky' knowledge, links to prior learning and enjoyment.

Reception

Through their curriculum, play-based activities and regular Welly Walks in the local environment, our Reception children are introduced to numerous scientific principles. They are given opportunities to talk about their observations, particularly regarding plants, animals and nature. They start to develop an understanding of growth, decay and change and show care and concern for living things and our environment. They are introduced to the changing seasons and how this effects the world around them. Other areas of their curriculum (such as art and DT) provide further insight into key scientific themes such as texture, materials and joining constructions pieces together.

Animals Including humans (Incl. Y6 Evolution and Inheritance)

Year 1

In Year 1, Science begins with a look at our five senses and why they are so important. The children will learn the names of each of the five senses, why they are important and which body part they link to. To re-enforce this learning, the children will undertake a chocolate investigation which not only involves the five senses but provides time to discuss how people's senses differ (e.g. chocolate may taste different to different people). The children will do a close study of the eye before looking at the names of some key body parts and celebrate the amazing things our body can do. This unit provides the key building blocks and prior learning to support the other 'animals including humans' units in our science curriculum.

Having previously focused on humans, the children in Year 1 will now learn about animals, including the different varieties of animals and importantly what makes them different. Comparing different types of animals is important to develop and embed our knowledge and allow us to make links. **These observations will also build on their work in EYFS where through their curriculum and welly walks they are able to talk about animals they have observed**. The children's scientific vocabulary is developed in this area as the children learn the key terms of carnivore, herbivore and omnivore (terms that will be very important later in the school's science curriculum when the children are introduced to food chains). This unit ends with another opportunity to build on and re-enforce the work completed in the EYFS. **In the Early Years, the children learn to show care and concern for living things and now in Year 1 focus on what a pet is and the different types of pets we can have**. This also allows for retrieval of key prior learning (e.g. the different varieties of animals and the key vocabulary of carnivore, herbivore and omnivore)

Year 2

In Year 2, the children look closely at offspring and understand that they will grow into adults. **They recap and extend their knowledge of the different animal groups from Y1**, looking to draw on prior learning to help them classify the animals. They also extend their learning by addressing young animals and their adults. This will also help as they are introduced to life cycles before they make their own life cycle to share with the class. This unit also introduces the concept of survival. Animals (and humans) not only need things to grow but to survive as well. The children focus on the importance of water, food and air. Having spent time looking at animals, the children will then focus on themselves and the journey to adulthood and beyond. They will understand the need to stay healthy as we grow and move through the different stages of human life.

Year 3

The animals including humans topic continues in Year 3. **Having previously discussed (in Year 1 and Year 2) the importance of food in animals and human's survival**, the children in Year 3 now questions what foods should we eat to get the nutrition we need. They discuss staying healthy and learn about a balanced diet. The children will learn about the different food different animals eat (**and demonstrate that they have retained the key vocabulary of omnivore, carnivore and herbivore**). The importance of the human skeleton and its function will be discussed and the children will learn how it protects and supports the body. Finally, the children will be introduced to muscles, joints and the importance of exercise.

Year 4

In Year 4, the children start by **retrieving their prior learning on carnivores, herbivores and omnivores** and use this knowledge to complete a Venn diagram. **Building on their introduction to food chains in Year 2,** the children in Year 4 recall their understanding of consumer and producer and extend their knowledge to understand the direction of energy displayed on a food chain. The children are also introduced to the teeth, why they are important, their role and how to look after them. **Previously the children have also discussed the importance of food for nutrition** and now they learn what happens to the food once we swallow it. Time is given to discuss the digestive system and begin to understand how some of the parts work.

Year 5

Our Animals including humans topic continues in Year 5. **Having previously looked at animal life cycles in Year 2**, the children now look at the life cycle of a human; describing the stages of human growth and development. They will investigate whether all babies grow the same and learn that in fact all babies grow at different rates. They will also understand how long it takes for a baby to grow in the womb (developing the key vocabulary of gestation at the same time). They will learn more about their own bodies and begin to understand what

will happen to them during puberty. They will begin to question what happens during old age and learn about life expectancy (for both animals and humans).

Year 6

Our final animals including humans unit, asks the children to consider how we can keep our bodies healthy. **The children will build on the introduction to healthy eating from Year 3**, **recapping on balanced diets** before delving further into the importance of variety in our diet and considering how smoking, alcohol and drugs effect the body (also discussed in our RSE curriculum). They will focus heavily on the heart; understanding the role of the circulatory system, how blood is pumped around the body and what happens to our heart when we exercise. Time spent discussing exercise, will also allow the children to discuss and understand how muscles move the skeleton.

Having previously learnt how different habitats provide for the basic needs of different kinds of animals (Year 2), the children in Year 6 will learn how animals and plants have adapted to suit their environment and why this is important. They will also learn about inherited characteristics and why certain characteristics are more likely to be passed from generation to generation. They will learn about Charles Darwin and his work and become familiar with the concept of evolution. They will understand how fossils (**also taught in Year 3**) help us to understand more about the process of evolution. They will also begin to understand how the actions and behaviours of humans can also affect change in species over time, asking 'why do living things change over a period of time?'

Plants

Year 1

Having observed many plants throughout their time in Early Years (particularly through welly walks), the children in Year 1 delve deeper into the topic of plants. **In Early Years, the children are introduced to some of the key terms such as leaves and petals and** now in Year 1 not only do the children extend their knowledge of the structure to include more terminology they learn the definition of a plant. They learn to group different plants and learn what a plant needs to live and grow. The children also learn about different trees and their structure before completing a local investigation in the school (identifying the different trees in our environment)

Year 2

This unit begins with an ideal opportunity to **draw on prior learning from Year 1 by recapping on what plants need to grow**. The children then test this knowledge with an investigation and begin to understand what a fair test is. This unit extends their knowledge of plants by observing and describing how seeds and bulbs grow. The children will look closely at the parts of the seed before learning the key vocabulary of germination. Having already looked at the life cycle of an animal, the children will now focus on the life cycle of a plant before investigating how plants grow in different environments.

Year 3

Starting with a recap of the main parts of a flowering plant, the children quickly move onto a focus on one particular key part of a plant – the roots. The children will learn what the roots do, how they grow and how water is transported through a plant. They will also understand the role played by leaves and why they are so important to a plant. They will also begin to understand that plants need to make their own food. **Following on from the life cycle of a plant in Year 2,** the children in Year 3 will focus more closely on the vocabulary and processes of germination, pollination and seed dispersal. They will learn how a seed turns into a plant but also understand that seeds are a good food source for animals.

Year 5

Having focused on plant growth in KS1 and the need for plants to make their own food in lower KS2, the children in Year 5 now consider the difference between sexual and asexual reproduction in plants. They will consider the importance of wind and insects to transfer pollen but also consider what plants that don't use wind or insects do to reproduce. **Looking again at animal life cycles** (**addressed earlier in Y2**), they will now extend this knowledge to understand the role of sexual reproduction in the development of and life cycle of an animal. They will understand why animal reproduction is so important and how animals sadly become endangered. They will also learn about Jane Goodall to further understand endangered animals. They will also extend their earlier knowledge of life cycles by discussing and learning the key term metamorphosis.

Living Things & Their Habitats

Year 2

In Year 2, the children begin to question and compare the differences between living and dead things. **In Year 1, the children learn about different animal groups and classify them against their diet (which of course helps keep them alive).** Now in Year 2, this is extended so children understand what is needed to live, i.e. MRS. GERN. Not only this, but the children **extend their knowledge of herbivore, carnivore and omnivore (from Year 1)** and are introduced to the terms producer and consumer. Once the children know whether something is alive or not, they can consider the associated habitats. Most importantly, the children will learn that animals (and humans) live in habitats to which they are suited. Time is also given to focus on microhabitats and take part in a local investigation in the school environment.

Year 4

In Year 4 the children advance their understanding of habitats (**previously discussed in Year 2**), matching a wide range of animals to their habitat and consider why that habitat is suitable. They will understand that organisms can be grouped by characteristics; focusing predominantly on their similarities. They will learn to classify animals and use the terms vertebrate and invertebrate as a means by which to do this. The children will also use classification keys to identify unfamiliar animals. Finally the children will begin to understand how we negatively impact on habitats and the environment; focusing on deforestation (something Year 4 will also discuss in Geography this year).

Year 5

Having focused on plant growth in KS1 and the need for plants to make their own food in lower KS2, the children in Year 5 now consider the difference between sexual and asexual reproduction in plants. They will consider the importance of wind and insects to transfer pollen but also consider what plants that don't use wind or insects do to reproduce. **Looking again at animal life cycles** (**addressed earlier in Y2**), they will now extend this knowledge to understand the role of sexual reproduction in the development of and life cycle of an animal. They will understand why animal reproduction is so important and how animals sadly become endangered. They will also learn about Jane Goodall to further understand endangered animals. They will also extend their earlier knowledge of life cycles by discussing and learning the key term metamorphosis.

Year 6

Our final living things and their habitats unit will focus on the importance of classification. **Drawing on all their prior learning in this topics**, the children will be able to give reasons for classifying animals based on their similarities and differences. They will use broad characteristics to classify organisms before **using their knowledge of plants** to classify them against their characteristics. To further develop their understanding in this field, they will be introduced to Carl Linnaeus and his classification system. Finally, they will look at micro-organisms; focusing on bacteria, fungi and protist. They will begin to understand the differences between these micro-organisms before working out how to group them.

Materials: - Everyday materials (Y1), - Uses of everyday materials (Y2), - Rocks (Y3), - States of matter (Y4), - Properties & changes of materials (Y5)

Year 1

This unit provides the important building blocks for the materials work covered throughout the rest of the school in our Science curriculum. **Having spent time in Early Years experimenting with various construction materials and begun to construct stacking blocks and joining different construction pieces together**, the children in Year 1 can now question whether we do use the same materials for everything. Time is given to distinguish between object and material and to learn the names of some key types of everyday materials. The children will be introduced to the term properties and evaluate which materials are best for a given object. This will also allow for the development of key vocabulary such as, waterproof, absorbent, opaque, transparent

Year 2

Following on from the introduction to different types of materials in Year 1, the children in Year 2 now focus on the suitability of materials; assessing a materials ability to successful undertake a particular job. They **look closely at many materials learnt in Year 1** and now understand that some are natural and some are man-made. During this topic, they will also focus on a key theme (that supports the science learning to come in KS2 as well as the work undertaken in DT across school) that of change. Children will learn that materials can be changed and that some of these changes cannot be undone. They will focus on squashing, bending, twisting, stretching and begin to understand what happens to a material when these actions take place. Finally, the children will be given a brief introduction to recycling and the need to be mindful of the materials we use and how we can recycle them to protect our planet (a theme that will be built upon throughout KS2)

Year 3

Having spent time looking at different materials in Year 1 and Year 2, classifying them and understanding what they can be used for, the children in Year 3 now focus on one particular material – rocks. They will begin to identify some common rocks and **build on the work from Year 2 with regards to natural and man-made** materials. Time will be given to explore different rocks and discuss how they can be categorised. The key vocabulary of erosion and permeable will be discussed before the children complete an erosion experiment. The work on rocks will also focus on soil and the importance of fossils (another important theme that will be discussed later in KS2).

Year 4

Having previously looked at the characteristics and properties of materials, the children in Year 4 now extend this knowledge by introducing the concepts of solids, liquids and gases. They will understand that some materials can be changed by heating or cooling them and that some materials can also return to their original state. They will investigate temperatures and learn when things melt or freeze. They will investigate the key terms of evaporation and condensation and use this new knowledge to understand the water cycle and how the process of evaporation and condensation works within the water cycle.

Year 5

This materials unit begins with a recap on (**from KS1**) and extension of material properties. The children will learn to compare materials based on key properties such as hardness, permeability, transparency, magnetism and flexibility. **Drawing on the introduction to conductors and insulators in electricity in Year 4**, the children will now relate this to thermal insulators and complete an ice cube investigation; seeking out and discovering the best thermal insulator. **They will also use their Year 4 knowledge** to help them work out how to make a bulb in a circuit brighter (**electrical conductors**). The unit will finish with a look at materials and discover what happens when we dissolve something in water. They will also consider how we can separate mixtures of materials. Finally, they will learn that some changes result in new materials and, **unlike in Year 4 where changes were reversible**, that some of these changes are irreversible.

Forces: Forces and magnets (Y3) and Forces (Y5)

Year 3

Year 3 sees the introduction of forces. Children will learn what forces are, will learn to identify pushes and pulls and understand that forces need contact between two objects. The children will investigate and compare how things move on different surfaces and learn that

forces are measured in Newtons. They will also learn about the force of magnetism. They will look at magnets and learn the key vocabulary of attract and repel; as well as the fact that magnets have two poles. They will investigate how we know something is magnetic and questions what magnets can be used for.

Year 5

In this Forces unit, **the children will draw on and develop their knowledge from their work in Year 3**. They will start with an important **recap (from Year 3) of what forces are**. They will focus closely on the force of gravity understanding what it is, why it's important, how it's measured (**briefly discussed in Year 3**) and who discovered it. They will understand why objects fall to the floor before investigating whether you can slow something down that is falling. This will enable the children to develop their scientific vocabulary further, spending time learning about, air resistance, before moving onto water resistance and friction. The children will then experiment with different materials in an attempt to (through friction) slow a moving vehicle down. Finally, the children will understand how different mechanisms (including gears, pulleys and levers) work to help move an object; especially heavy objects (this objective also supporting our work in DT).

Electricity

Year 4

During this unit, the children discuss what electricity is, where we find it and, more importantly, do we need it. They will investigate which products require electricity and whether these products are powered by battery or mains. Importantly, the children will learn how to stay safe around electricity. They will have to firstly be able to identify the risk and then decide how to reduce or eliminate said risk. This will also lead to the development of core electricity-based vocabulary and an understanding of conductors and insulators. The children will build on their simple circuit knowledge from Y3 (**Y3 D&T circuits**) and discuss switches. They will learn how to add a switch to a simple circuit and understand how they can improve safety in an appliance (and thus reduce risk as taught earlier in the unit).

Year 6

Following on from Year 4, the children will now learn more about electricity and how sophisticated a circuit can really be. They will learn what the difference is between current and static electricity. **They will extend their work on circuits beyond the simple circuits of Year 4** and learn about series and parallel circuits. They will focus more closely on the symbols relating to circuits and consider how they can make important changes to a circuit. **They will draw on prior learning (from Year 5) on how to make a bulb brighter** and also consider how to make the speed of a motor quicker. They will also investigate how the length of a wire effects a circuit before putting all their electricity knowledge together to create a working burglar alarm.

Light

Year 3

Following an introduction to the eye in Year 1, the children in Year 3 now extend this knowledge by focusing on light. They begin by understanding that light is needed to see things and that a variety of things can create light. Time is given to address the concept of dark and the formation of shadows. Children in Year 3 learn why light is important but that it can also be dangerous (e.g. UVA rays). The important scientific concept of reflection is introduced during this topic and time is given to look at reflective surfaces as well as how reflections are made.

Year 6

Following on from the work in Year 3, the children will delve deeper into the concept of light. **They will begin with a retrieval lesson, showing their understanding of light sources and shadows from Year 3.** They will look closely at the eye and discuss the importance of each part before learning that light travels from the source in a straight line, reflects off an object and then travels to our eye. **As well as readdressing reflection**, the children will also consider the term refraction and will be able to explain the difference between these two important terms. Finally, the Year 6 children will begin to understand that white light can be split into a spectrum of seven colours (and learn which colours these are).

Sound

Year 4

In Year 1, the children learn about the five senses, now in Year 4 they will focus on the ear and the importance of sound. They will look closely at the ear and understand that sounds are made due to vibrations. They will use equipment to observe visible vibrations and discuss what happens with louder sounds and vibrations. A walk around their local environment will teach them about different sounds and how they travel through different materials and learn about muffled sounds and soundproofing. They will ask what happens to a sound as it gets further away and investigate suitable materials for soundproofing. The unit will end with the development of more scientific vocabulary and the importance of pitch. They will learn the difference between pitch and volume before discussing how length, thickness and tightness of a string affect pitch.

Seasonal Changes (Y1) & Earth & Space (Y5)

Year 1

In this unit, Year 1 **extend the learning from Early Years (where the children were introduced to growth and the effects of changing seasons**) and now question how each season is different. The children learn the names for the four seasons and begin to question what is associated with these seasons. This allows for discussions around associated colours as well as the weather associated with each season.

The children continue to develop their comparison work, looking for similarities and differences between the seasons before investigating how the length of the day changes in each season. They will also consider growth (another science theme covered in Year 1) to discuss and portray the representation of a tree during the different seasons.

Year 5

Having previously (in Year 1) learnt about Seasons in Science and Space in History, the children in Year 5 will delve into Space once more. **They will recap on prior learning and the history of space travel** (for context) before looking closely at the sun, moon and planets. They will consider the shape of these celestial bodies and learn that we would term them as approximately spherical. They will learn the names of the planets before learning more about how they move and the importance and relationship to the sun. They will look at day and night (**which will give an opportunity to draw on their knowledge of shadows from Year 3**) before looking closely at the moon, it's movement and the challenging questions, 'does the moon only come out at night?'

Science Long-Term Plan

	Autumn		Spring		Summer	
Year 1	Animals including humans	Seasonal changes	Everyday materials	Animals including humans	Plants	Seasonal changes
Hook	What can my body do?	How is each season different?	Do I use the same materials for everything?	Are all animals the same?	How can I grow plants?	How is each season different?
Year 2	Animals including humans	Habitats and living things	Exploring everyday materials		Super Scientists and inventors	Growing Plants
Hook	Will I always look the same?	Why do you love where you live?	What would you build your house out of and why?		Do scientists always wear white coats?	Are plants all around us?
Year 3	Animals including humans	Forces and magnets	Rocks	Light		Plants
Hook	How amazing are human and animal's bodies?	How powerful can forces be?	Are rocks really that interesting and important?	What's so important about light and dark?		How do plants grow and support themselves?
Year 4	Living things and their habitats	Animals including humans		Electricity	Sound	States of matter
Hook	What makes animals the same and different?	Why do some of my teeth look different?		Do we need electricity?	Can you hear what I hear?	Can I save a melting ice cream?
Year 5	Properties & Materials		Space	Forces	Animals including humans	Living things and their habitats
Hook	What are things around us made of and why?		What can I see in the night sky?	How can I make things move?	How do humans change?	How do plants and animals reproduce?
Year 6	Animals including humans	Electricity	Evolution & Inheritance	Light	Living things and their habitats	
Hook	What can we do to keep our bodies healthy?	How do I make a working electrical circuit?	Why do living things change over a period of time?	How does light affect the way we see objects?	How can we classify living things?	

How will we know the children learn well in Science at our school?

How well do children learn in Science?	Evidence
Pupils can use the knowledge and vocabulary they have learnt to verbally articulate their understanding. They show that they can retain facts.	Child-led Book Looks Pupil voice
Pupils can use knowledge they've learnt and transfer to a structured piece of writing. Showing they can retain facts and show an understanding of their learning.	Book Looks Pupil voice
Pupils use topic walls effectively to show how they are building on prior learning and using current knowledge and vocabulary to develop understanding.	Work scrutiny Pupil voice Homework Displays
Pupils show a natural curiosity for their topic	Pupil voice Homework Classroom visits
Use of progression documents allows pupils skills to develop through year groups	Work scrutiny Pupil voice Topic Plans Progress Planners