How Our Science Curriculum is Organised

Substantive Knowledge and Core Concepts

National Curriculum – knowing about:

- Plants
- Animals (including humans)
- Use of everyday materials
- Seasonal change
- Living things and their habitats
- Rocks
- Light
- Forces and magnets
- States of matter
- Electricity
- Properties and changes of materials
- Earth and space

Substantive Dimensions:

- Physics
- Chemistry
- Biology
- Earth Sciences

Disciplinary Knowledge and Skills – Thinking and Working Like a Scientist

Working scientifically:

- Observing over time
- Pattern-seeking
- Identifying
- Classifying and grouping
- Comparative and fair testing
- Researching using secondary resources

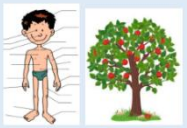
The place of science in the world:

- Asking big questions
- Science and the future
- Linking science to other disciplines

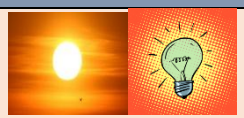
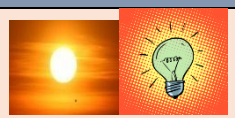
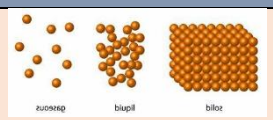
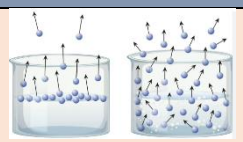
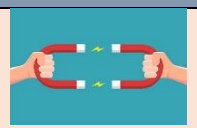
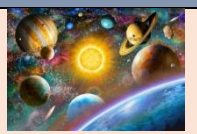
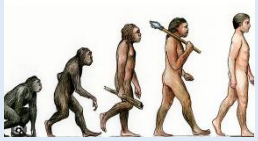
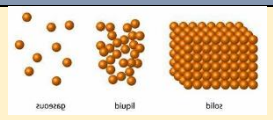
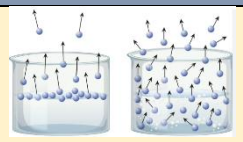
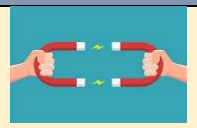
Rationale

Science provides children with the foundations for understanding the world through specific disciplines of biology, chemistry and physics. Science aims to build a body of key foundational knowledge and concepts and for children to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. Our pupil numbers and classing structures change year-on-year, requiring a rigorous structure of teaching the scientific units, but with enough flexibility to adapt as cohorts change. We provide all children with opportunities to make sense of the world around them through being naturally inquisitive and working scientifically through investigations to answer questions, and challenge things they have learned.

EYFS/KS1 Threads of learning and Conceptual Overview

	Autumn	Spring	Summer
Year A	**Living Things and Their Habitats** **Seasonal Change**	**Plants** **Seasonal Change**	**Humans/Plants** **Seasonal Change**
Year B	**Everyday materials** **Seasonal Change**	**Animals** **Seasonal Change**	**Growth** **Seasonal Change**
Year C	**Living Things and Their Habitats** **Seasonal Change**	**Plants** **Seasonal Change**	**Humans** **Seasonal Change**
			
Year D	**Everyday materials** **Seasonal Change**	**Animals** **Seasonal Change**	**Growth** **Seasonal Change**

KS2 Threads of learning and Conceptual Overview

	Autumn		Spring		Summer	
Year A	Y3/4 Plants/Living things in their habitats	Y5/6 Living things and their habitats	Y3/4 Rocks/Sound	Y5/6 Evolution and Inheritance	Y3/4 Animals including humans	Y5/6 Animals including humans
Year B	Y3/4 Light/Electricity	Y5/6 Light/Electricity	Y3/4 States of Matter	Y5/6 Properties and changes of materials	Y3/4 Forces and Magnets	Y5/6 Forces/Earth and space
						
Year C	Y3/4Plants/Living things in their habitats	Y5/6 Living things and their habitats	Y3/4 Rocks/Sound	Y5/6 Evolution and Inheritance	Y3/4 Animals including humans	Y5/6 Animals including humans
						
Year D	Y3/4Light/Electricity	Y5/6 Light/Electiricty	Y3/4 States of Matter	Y5/6 Properties and changes of materials	Y3/4 Forces and Magnets	Y5/6 Forces/Earth and space
						

	Autumn		Spring		Summer	
Year A EYFS and KS1 Threads	**Living things Seasonal Change**		**Plants Seasonal Change**		**Plants Animals including humans Seasonal Change**	
EYFS Knowledge Blocks	**3- and 4-year-olds** I **can identify and name some animals and plants** I can talk about where animals live I know about the life cycle of one animal I can explore the natural environment and can talk about what I see, hear and feel **I can talk about different types of weather.** I can talk about today's weather and talk about the clothes I might need to wear. I know about the changing season Autumn and can talk about what I see in Autumn e.g., different coloured leaves **Vocab**: animals, plants, live, life cycle, Autumn, cold, leaves, hibernate, boots, coat, wellies, rain, clouds	**Reception** I **know that animals and plants live in different places** I know 2 or more places where animals and plants live I can name animals and plants that live in these places I know about the food chain of one familiar animal **I know changes that occur in autumn – leaves changing colour, leaves falling from trees,** **I know that the weather is turning colder in Autumn** **Vocab:** habitat, different habitats e.g., woodland, rainforest, ocean etc. Different animals and plants, food chain, autumn, winter, leaves, colour, tree	**3- and 4-year-olds** **I know the names of some common plants e.g. grass, daisy, sunflower etc.** **I can describe what plants look like** I know where to find plants I know about the life cycle of a plant I know that plants need water to stay alive. **I can talk about different types of weather.** **I can talk about today's weather and talk about the clothes I might need to wear.** **Vocab:** plants, flower, water, survive, stay alive, weather, sunny, rainy, windy, snowy, boots, sunhat, sunglasses, hat, scarf, gloves	**Reception** **I can name some common plants and flowers that I can see in the environment around me** **I can name some common trees that I can see in the environment around me** **I know the basic parts of a plant (flower, stem, leaves, roots) and can locate these on a plant** I know the key features of the life cycle of a plant. I know how to keep plants alive. **I know changes that occur in winter – cold, ice, frost, snow** **I know that the weather is turning colder in Winter** **Vocab:** plants, flower, stem, leaves, roots, weather, warmer, colder, sunny, rainy, windy, snowy, Winter, Spring	**3- and 4-year-olds** I **can sing songs to help me name some basic body parts e.g. heads, shoulders, knees and toes** I can use vocabulary to describe what things look like, feel like, taste like, sound like and smell like I know where to find plants I know the names of some common plants e.g. grass, daisy, sunflower etc. I can describe what plants look like I know about the life cycle of a plant I know that plants need water to stay alive. I can talk about different types of weather. I can talk about today's weather and talk about the clothes I might need to wear. **Vocab**: plants, flower, water, survive, stay	**Reception** I **can name basic parts of the body (head, shoulders, eyes, ears, mouth, nose, legs, arms)** I know my 5 senses – smell, taste, hear, touch, sight and can use words associated with the senses I can name some common plants and flowers that I can see in the environment around me I know the basic parts of a plant (flower, stem, leaves, roots) and can locate these on a plant I know how to keep a plant alive I know the key features of the life cycle of a plant. **I know changes that occur in Spring and Summer – weather getting warmer, sunshine, flowers blooming, animals being born etc.**

					alive, head, shoulders, knees, toes, eyes, ears, mouth, nose, feel, smell, taste, look, sound, weather, sunny, rainy, windy, snowy, boots, sunhat, sunglasses, hat, scarf, gloves	**I can notice changes in weather in Spring and Summer** **Vocab:** plant, flower, stem, leaves, roots, life cycle, body, head, arms, legs, shoulders, stomach, weather, summer, warmer, holidays, season, Spring, Summer
Substantive dimension	**Biology** **Earth Sciences**		**Biology** **Earth Sciences**		**Biology** **Earth Sciences**	
KS1 Vocabulary	**Seasonal change:** seasons (winter, spring, summer, autumn), weather (sunny, rainy, windy, snowy etc.), sun, sunrise, sunset, day length, temperature. **Living things and their habitats:** life processes, living, dead, never been alive, suited/suitable, basic needs, food, food chain, habitats, microhabitats, shelter, move, feed, names of local habitats e.g., pond, woodland, names of micro-habitats e.g., under logs, bushes etc.		**Seasonal change:** seasons (winter, spring, summer, autumn), weather (sunny, rainy, windy, snowy etc.), sun, sunrise, sunset, day length, temperature. **Plants:** wild plants, garden plants, weeds, deciduous tree, evergreen tree, leaves, flower, blossom, Petals, fruit, berry, roots, bulb, seed, stem/trunk, branches, bark, names of trees/plants in the local area.		**Seasonal change:** seasons (winter, spring, summer, autumn), weather (sunny, rainy, windy, snowy etc.), sun, sunrise, sunset, day length, temperature.. As for Y1 (see Spring) plue light, shade, sun, warm, cool, water, grow, healthy, germination **Animals, including humans:** Head, body, eyes, ears, mouth, teeth, leg, senses (touch, smell, see, hear, taste), fingers (skin), eyes, nose, ear, tongue, other parts of the body.	

Rationale	Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. Children will already have some experience of naming a variety of different plants and animals found in the environment around them. This topic aims to build on this prior knowledge and allows children to start identifying and comparing plants and animals in different ways, not limited to just their name (e.g., alive, dead, never alive). Children will learn about a variety of different habitats and will explore how animals are suited to these habitats – they will not be limited to just those habitats found in their local area and will be exposed to habitats found in various places around the world e.g., rainforests (which ties in with our whole school topic this term). Alongside seasonal change, we will continue to look at habitats throughout the year so that we can build up a full picture of the animals in a habitat.	Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. Children will have already started to explore the environment around them in EYFS and will know about some similarities and differences in relation to living things. This topic aims to build on this prior knowledge and children will start to name and identify plants in their local environment as well as looking at the key characteristics of these plants and their structure. This topic follows on from LT&TH whereby children will have started to identify plants in different habitats. Although we will look at plants all year round (linked with seasonal change), this topic will be taught in the Spring term so that we can observe plants that are starting to grow in the local environment and start to plant our own to make observations over time.	Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. This topic builds upon the previous terms' learning on plant identification. Children will continue to identify and classify different plants as well as observe plants in the local environment. They will deepen their knowledge by focussing on what plants need to grow and stay healthy. If pupils encounter the Year 2 Plants topic as the first cycle, they will not have the necessary prior knowledge from the Year 1 topic to access the learning therefore it is important that this topic is taught after the Year 1 topic. This topic will be taught in the summer term when there is sufficient light in the classroom to grow plants. Children will also be given the opportunity to explore the bulbs that they planted in the Autumn term which can allow them to explore first-hand the life cycle of a plant. Children will have already started to explore similarities and differences between living things in EYFS. They will have had opportunities to make observations of animals and to explain why some things occur and talk about changes. This topic has been split into 2 sections and we will focus on the human aspect this half term, linking it with our whole school topic 'food glorious food'. It is important to ensure that, as we teach this topic, children understand that humans are animals. Children will learn about the different parts of the human body and will explore how their senses are linked to particular body parts.

Key Text	**Where is my home?**		**Wild** **The Great Kapok Tree**
Memorable experience	Plant a broken dragon egg in the classroom. Footsteps leading away, children to follow the trail and discover what happens next.	Walk in the locality looking for signs of spring	A trip to the Life centre Newcastle
KS1 National Curriculum and Knowledge Blocks	**Seasonal change (Y1)** • Observe changes across the four seasons and describe the difference • Observe and describe weather associated with the seasons and how day length varies **Living things and their habitats (Y2)** • 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 micro-habitats • 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 **Seasonal change** **I know what the features of Autumn and Winter are and what happens to trees in this season (weather, animals, plants).** I know that Autumn and Winter are seasons of the year. I know when Autumn and Winter occurs. **<u>Living things and their habitats</u>**	**Seasonal change (Y1)** • Observe changes across the four seasons and describe the difference • Observe and describe weather associated with the seasons and how day length varies **Plants (Y1)** • 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 **Seasonal change** **I know what the features of Winter and Spring are and what happens to trees in this season (weather, animals, plants).** I know that Winter and Spring are seasons of the year. I know when Winter and Spring occurs. **Plants: (Y1)** **I know what wild and garden plants are and can name a variety of common wild and garden plants.** **I know the different parts of a plant including roots, stem, leaves, flower, petals, trunk, branches, fruit.** **I know the names of common trees (beech, oak, ash)** **I know the difference between evergreen and deciduous trees and can identify different evergreen and deciduous trees.** I know that plants are grown from seeds or bulbs. I know that we can eat different plants in the form of fruit and vegetables.	**Seasonal change (Y1)** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies **Plants (Y2)** • 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 **Animals, including humans (body – senses) (Y1)** • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense **<u>Knowledge blocks:</u>** **Seasonal change** **I know what the features of Spring and Summer are and what happens to trees in this season (weather, animals, plants).** I know that Spring and Summer are seasons of the year. I know when Spring and Summer occurs. **<u>Plants (Y2)</u>** **I know that plants can grow from either seeds or bulbs.**

	I know the differences between things that are alive, dead and things that have never been alive. **I know what a habitat is and can name habitats in my local area e.g., woodland, pond, grass etc. as well as habitats around the world e.g. rainforest.** **I know that living things live in habitats to which they are suited and I know that habitats provide for the basic needs of animals e.g., shelter, space to move and grow, food and water.** **I know the names of a variety of animals and plants that live in different habitats, including in microhabitats.** **I know how animals obtain food from plants and other animals and can represent this in a food chain.**		**I know that plants need water, light, and a suitable temperature to grow and survive.** **I know that seeds and bulbs germinate and then grow into seedlings and then continue to grow into mature plants – plant life cycle.** I know that seeds and bulbs need to be planted at different times of the year and will germinate and grow at different rates. **<u>Animals, including humans (body – senses)</u>** **I know the names of different parts of the human body including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth** **I know the 5 senses associated with the human body – touch, smell, hear, taste, sight** **I know which part of the body is associated with each sense.**
	Working scientifically continues throughout all topics		
Year A LKS2 Topic	**Plants (Y3) Living things and their habitats (Y4)**	**Rocks (Y3) Sound (Y4)**	**Animals, including humans (Y3 & 4)**
Substantive dimension	**Biology**	**Earth Sciences Physics**	**Biology**
LKS2 Vocabulary	**Plants:** Roots, stem/trunk, leaves, flowers, air, light, water, nutrients, transportation, life cycle, photosynthesis, pollen, insect/wind pollination, seed formation and seed dispersal (wind, animal, water).	**Rocks:** Rocks, stone, pebble, boulder, grain, crystals Layers, hard/soft, texture, absorb, water, soil and fossil. **Sound:** Sound, source, sound wave, vibrate, vibration, travel, pitch (high, low), volume, faint, loud and insulation.	**Animals, including humans (Y3)** Nutrition, nutrients, carbohydrates, protein, sugars, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine **Animals, including humans (Y4):** digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large

			intestine, nutrients, rectum, anus, teeth – incisor, canine, molar, premolar
Rationale	**LKS2** ***Plants:*** Have an annual cycle at different times of the year so changes should be observed throughout the year. Children have already observed and planted seeds during their work in KS1, this work will deepen their understanding of the functions of the different parts of a plant and their lifecycle. ***Living things:*** Following on from this, children will be able to use their learning about plants and begin to classify plants and animals into groups and link their work on plants to explore what problems changes to their environment may cause.	**LKS2** ***Rocks:*** Although children do not study rocks previously, they do understand different materials and their properties. This unit is key in preparing them for their work on evolution and inheritance in years 5 and 6. Children can link this learning with the whole school topic and can explore the types of rocks found in their local village. ***Sound:*** This unit builds on the children's general understanding of objects making different sounds and the ear being. It is a reasonably short unit of work so works well with rocks as another short unit. The topic can be considered a little challenging so is not taught at the beginning of the year but more towards the end.	**LKS2** ***Animals, including humans:*** This unit is taught after plants and living things so the children can utilise their knowledge of both when learning about food chains and grouping and classifying animals. Their understanding of nutrients in plants will help them when learning about the digestive system in humans. They can link their knowledge of teeth to classifying animals into herbivores and omnivores. Teaching this topic after living things is also useful as it means children can construct food chains based on their first-hand experience of visiting a local habitat and identifying the plants/animals in this habitat.
Key Text	**Botanicum**	**The street beneath my feet**	**World of food**
Memorable experience	Forest School	Drumming workshop	A trip to the life centre Newcastle
LKS2 Learning National Curriculum and Knowledge Blocks	**Plants (Y3):** • 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.	**Rocks (Y3)** • 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. **Sound (Y4)** • Identify how sounds are made, associating some of them with something vibrating	**Animals, including humans (Y3)** • 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. **Animals, including humans (Y4)**

	• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. **Living things and their habitats (Y4)** • 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 **<u>Plants</u>** **I know the names of different parts of the plant and can describe the function of these parts (stem/trunk; leaves and flowers).** **I know that plants have roots to provide support and to draw moisture from the soil, through stems to take water to the rest of the plant.** **I know that seeds/bulbs require the correct conditions to germinate and grow and that these differ from plant to plant (air, light, water, nutrients from soil, room to grow).** **I know that flowering plants have evolved specific parts to carry out pollination, fertilisation and seed production.** **I know that seed dispersal improves a plants chances of successful reproduction.** I know that plants are producers and that they make their own food. I know that the leaves absorb sunlight and carbon dioxide. **<u>Living things and their habitats</u>** **I know that living things can be divided into groups based on their characteristics e.g.,**	• 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 **<u>Rocks</u>** **I know that there are different types of rock.** **I know that fossils are made when things that have lived are trapped within rocks.** **I know that soil is made when things that have lived are trapped within rocks.** **I know that there are different types of soil.** **I know that fossils provide evidence that living things have changed over time** I know that palaeontologists use fossils to find out about the past. **<u>Sound</u>** **I know that sound is produced when an object vibrates.** **I know that sound travels through the air in soundwaves to the ear which vibrates our ear drum.** **I know you can change the volume and pitch of a sound.** **I know bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds** **I know faster vibrations produce higher pitched sounds** **I know that the further away a sound is produced, the fainter it sounds to us (sound travel can be blocked || sound spreads out as it travels)**	• Describe the simple functions of the basic parts of the digestive system in humans • Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey. **<u>Animals including humans - Y3</u>** **I know that all animals, humans included need nutrients to survive and that foods are organised into food groups.** **I know that many animals have skeletons to support their bodies and protect vital organs.** **I know that muscles are connected to bones and move when they contract and that movable joints connect bones.** **I know what makes an invertebrate and a vertebrate.** **I know the names of some of the main bones of the human skeleton.** I know that different foods have different nutritional values and that the correct amount of each constitutes a balanced diet. I know that different animals are adapted to eat different foods. **<u>Animals including humans - Y4</u>** **I know the names of internal organs linked to the digestive system and can use these to describe how the body digests food.** **I know the names of the different types of teeth in our mouths and know the different jobs that these teeth do.** **I know how to sort animals into different groups to classify them and use this to construct a food chain**. **I know what producers, predators and prey are.**

	flowering and non-flowering plants, vertebrate and invertebrate etc. **I know that classification keys can be used to help group and name livings things** **I know that environmental change affects habitats differently.** **I know that different organisms are affected by environmental change differently.** I know that human activity can significantly affect the environment (both positively and negatively).		
Year A UKS2 Threads	**Living things and their habitats (Y5 & 6)**	**Evolution and Inheritance (Y6)**	**Animals, including humans (Y5 & 6)**
Substantive dimension	**Biology Earth Sciences**	**Biology Earth Sciences**	**Biology**
UKS2 Vocabulary	**Living things and their habitats (Y5):** Life cycle, reproduce, reproduction, sexual, sperm, fertilise, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs and cuttings. **Living things and their habitats (Y6):** Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering.	**Evolution and Inheritance:** Offspring, sexual reproduction, vary/variations, identical, inheritance/inherited, characteristics, suited, adapted, evolution, environment, species and fossils.	**Animals, including humans (Y5):** Baby, toddler, teenager, elderly, growth, fertilisation, prenatal, foetus, gestation, Reproduce, asexual reproduction, sexual reproduction, cell, pregnancy, life cycle, puberty, adolescence, menstruation, adulthood and life expectancy. **Animals, including humans (Y6):** Circulatory system, oxygen, heart, lungs, blood, blood vessels, nutrients, water, muscles, diet, exercise, drug, alcohol and lifestyle.
Rationale	**Living things and their habitats** Children have previously learnt about classifying animals into distinct groups which is key to then learning about the different groups' lifecycles in this unit. Further work on classifying will cement their understanding of diverse groups and expand their understanding of this. The work on reproduction will be built upon in the next unit of work 'Evolution and Inheritance'.	**Evolution and Inheritance** This work builds on previous work on rocks and fossils that the children studied in years 3 and 4. It links to the previous term's work on reproduction of living things and builds upon that, digging deeper into how plants/animals evolve over time and inherit characteristics from their parents. It will prepare them for work in KS3 on genes and DNA.	**Animals Including Humans** Before learning about the lifecycle of humans, it is important that children have an understanding of the lifecycle of animals which they learnt earlier this year. Having previously learnt about the digestive system, children are well placed to now begin to look in more depth about the workings of our heart and lungs. This in turn

	It is useful teaching this topic before 'animals, including humans' as it is helpful if children learn about the life cycle of plants and animals before learning about the life cycle of humans. This topic is also taught before 'Evolution and inheritance' otherwise children would not have the necessary prior knowledge from this topic to access the learning.		prepares them well for KS3 when they will look in more depth at these topics.
Key Text	**<u>Habitats</u>** **Hannah Pang & Isobel Lundie**	**The street beneath my feet**	**Anatomicum**
Memorable experience	Forest School	Drumming workshop (linked to LKS2) Trip to Runswick Bay to look for fossils	A trip to the life centre Newcastle
UKS2 National Curriculum and Knowledge Blocks	**Living things and their habitats (Y5)** • 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. **Living things and their habitats (Y6)** • 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. **<u>Living things and their habitats</u>** **I can compare the differences in the lifecycle of a mammal, an amphibian, an insect and a bird** **I know the reproductive process of animals.** **I can explain the reproductive process of a flowering plant.** **I know the reproductive process of non-flowering plans such as ferns and fungi.**	**Evolution and inheritance (Y6):** • 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 **<u>Evolution and inheritance</u>** **I know about how a palaeontologist works and how evidence is gathered.** **I know that family traits are inherited/passed down from parents and grandparents.** **I know how animals are specifically adapted to suit their habitat.** **I know that scientists believe humans evolved from apes to modern homo sapiens.** **I know that Charles Darwin discovered evolution of the species through his observational work.** I know about the importance of the finds of Mary Anning (the mother of palaeontology)	**Animals, including humans (Y5)** • Describe the changes as humans develop to old age. **Animals, including humans (Y6)** • 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 **<u>Animals including humans</u>** **I know and can describe the changes that we go through as we age.** **I know the names of the main parts of the circulatory system.** **I know what the function of the heart, blood vessels and blood is.** **I know how our body uses the food and water we intake in terms of nutrients in our body and**

	I know the work of key scientists such as David Attenborough and Marie Clark. **I know what a micro-organism is and can name some examples.** **I know the characteristics of different micro-organisms, plants and animals** **I know how to group micro-organisms, plants and animals and can justify** I can explain the impact of climate change on plants and animals. I know the different animal groups and can explain how this helps me to better understand them. I know the impact of invasive species on an eco-system such as the Florida everglades.		I know that dogs can be bred to select the most desirable genes from different breeds I know how the peppered moth changed during the industrial revolution to ensure its survival. I know the shape of the beaks of finches can affect the types of seed/nut it eats.		**how these are transported around the body and the body of other animals.** **I know the impact of diet and exercise on the body.** **I know the impact of drugs and alcohol on the human body** I know how we use the oxygen we breathe in. I know the nutritional value of some food and the impact of an unhealthy diet.	
Year B EYFS and KS1 Threads	**Materials**		**Seasonal Change Animals including humans**		**Animals including humans**	
EYFS Knowledge Blocks	**<u>3- and 4-year-olds:</u>** I know that not all objects feel the same **I can describe how objects feel and look e.g., hard/soft, colourful etc**. **Vocab:** hard, soft, squashy, fluffy, bumpy, smooth, colourful	**<u>Reception:</u>** I know objects are made from materials I know the names of at least 2 different materials **I know words to describe different materials e.g., hard, soft, heavy, light etc.** I know that materials can be changed e.g., through melting/freezing **Key vocab:** material, plastic, wood, glass, metal, paper, hard, soft, heavy, light, melting, freezing, float, sink	**<u>3- and 4-year-olds:</u>** I know that there are different types of weather **I can talk about today's weather and talk about the clothes I might need to wear** I know that there are lots of different animals I know the names of some animals I know words to describe what an animal looks like **Vocab:** weather, sun, rain, wind, snow, hat, sunglasses, boots, coat, scarf, gloves, animals,	**<u>Reception:</u>** **I know that Winter is one of the 4 seasons** I know that changes occur in winter e.g. cold, frost, ice, snow I know that the temperature is colder in the winter I know what an animal is I know the name of some common animals e.g., farm animals, pets I know that some animals can be kept as pets I can describe what an animal looks like and talk about some of its body parts e.g., head, leg, tail, paws etc.	**<u>3- and 4-year-olds:</u>** **I know that there are lots of different animals** I **know the names of some animals** I know about the life cycle of an animal e.g., a butterfly I know that I need to wash my hands to stops germs from spreading I know that some foods are healthier than others **Vocab:** animals, dog, cat, horse, cow, sheep,	**<u>Reception:</u>** **I know that animals have babies** I know about the life cycle of a human **I can talk about how I have changed since I was a baby** I know that I need water, air and food to survive I know some ways to keep myself healthy e.g., food choices, exercise, sleep, tooth brushing etc. **Vocab:** mum, baby, life cycle, human, changes,

			dog, cat, horse, cow, sheep, big, small, fluffy, fur, paws, horns, tail	**Vocab:** season, winter, weather, cold, sun, rain, wind, snow, temperature, frost, ice, day length, animal, cat, dog, horse, cow, sheep, pet, head, leg, tail, paw, fur, ears, horns, beak (& other animals/body parts)	butterfly, germs, poorly, clean, healthy	adult, young, old, water, air, food, survive, healthy, sleep, tooth brushing, exercise
Substantive dimension	**Physics**		**Biology**		**Biology**	
KS1 Vocabulary	**Y1 materials:** object, names of material e.g., wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, cardboard/card, rubber, wool, clay, properties, hard/soft, stretchy/stiff, shiny/dull, see-through, not see-through, rough/smooth, bendy/floppy, waterproof/not waterproof, absorbent/not absorbent, breaks/tears **Y2 materials:** **names** of materials e.g., wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, cardboard/card, rubber, wool, clay, **properties** of materials – as for year 1 plus opaque, transparent, translucent, reflective/non-reflective, flexible, rigid, Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching		**Seasonal change:** seasons (winter, spring, summer, autumn), weather (sunny, rainy, windy, snowy etc.), sun, sunrise, sunset, day length, temperature **Animals, including humans (animals):** head, body, eyes, ears, mouth, nose, ear, tongue, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, animals experienced first-hand from each vertebrate group		**Animals, including humans:** offspring, reproduction, growth, child, young/old stages (e.g., chick/hen, baby/child/adult, caterpillar/butterfly), exercise, energy, nutrition, heartbeat, breathing, hygiene, germs, disease, food types (e.g., meat, fish, vegetables, bread, rice, pasta)	
Rationale	**Rationale** ***Materials:*** Children will have already started to explore similarities and differences between different objects and materials in EYFS. In this topic, children will distinguish the differences between an object and the material from which it is made and will start to describe the materials using		**Rationale** ***Animals, including humans:*** Children will have already started to explore similarities and differences between living things in EYFS. They will have had opportunities to make observations of animals and to explain why some things occur and talk about changes. This topic has been split into 2 sections and we will focus on the 'animals' aspect this half term, linking it with our whole school topic 'Frozen Lands'.		**Rationale** ***Animals, including humans:*** Children will have already started to explore similarities and differences between living things in EYFS. They will have had opportunities to make observations of animals and to explain why some things occur and talk about changes. This topic allows children	

	more scientific vocabulary and will focus on the properties/suitability of these materials. The Y2 materials topic follows on from the Y1 topic. This allows for clear progression of knowledge/skills and enables children to effectively build upon their prior learning. The children will deepen their learning by exploring the suitability of different materials for particular uses – using the properties of these materials to justify their decision making. If pupils encounter the Year 2 Everyday materials topic as the first cycle, they would not have the necessary prior knowledge from the Year 1 topic to access the learning therefore it is important that the Year 2 topic follows the Year 1 topic. This topic lends itself well to the whole school topic as we can compare materials used for certain jobs in the past compared to materials used now for the same job. Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things.	Children will learn to identify different animals from different groups and will describe and compare the structure of said animals. The topic can be linked to our whole school topic as children can compare and describe polar animals and, linked with seasonal change, can explore how animals survive in the North and South Pole. Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things.	to build on the learning covered in the previous term. Children will have already started to explore similarities and differences between living things in EYFS. They will have had opportunities to make observations of animals and to explain why some things occur and talk about changes. This topic allows children to build on the learning covered in the previous term.
Memorable experience.	Den building – link forest schools	Sealife centre trip	Trip to a farm to see lambing (maybe Spring term depending on timing of Easter)
Key Text	Iggy Peck Architect	**<u>Tree: Seasons Come, Seasons Go</u>** Patricia Hegarty & Britta Teckentrup	**<u>Monkey Puzzle</u>** Julia Donaldson & Axel Scheffler
KS1 National Curriculum and Key Knowledge	**Seasonal change:** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies **Materials (Y1):**	**Seasonal change:** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies **Animals, including humans (animals) (Y1):**	**Seasonal change:** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies

	• 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. **Materials (Y2):** • 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. **<u>Knowledge blocks</u>** **<u>Seasonal change:</u>** **I know that Autumn and Winter are seasons of the year.** **I know what the features of Autumn and Winter are and what happens to trees in this season (weather, animals, plants).** I know when Autumn and Winter occur. **<u>Materials</u>** **I know what a material is.** **I know that objects are made from different materials and can identify the material that objects are made from.** **I know that materials have different properties.** **I know that different materials have different properties.** **I know that materials can be grouped depending upon their property.**	• 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) **<u>Knowledge blocks</u>** **<u>Seasonal change:</u>** • **I know that Winter and Spring are seasons of the year.** • **I know what the features of Winter and Spring are and what happens to trees in this season (weather, animals, plants).** • I know when Winter and Spring occur. **<u>Animals, including humans (animals):</u>** **I know the names of some common animals including fish, amphibians, reptiles, birds and mammals.** **I know that there are many different groups of animals have different characteristics.** **I know that animals can be grouped in different ways e.g., fish, amphibians, reptiles, birds and mammals.** **I know that different animals eat different types of food and that animals can be described as carnivores, herbivores and omnivores.** I know that animals need a variety of food to help them grow, repair their bodies, stay active and stay healthy.	**Animals, including humans (Y2):** • 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 **<u>Knowledge blocks</u>** **<u>Seasonal change:</u>** • **I know that Spring and Summer are seasons of the year.** • **I know what the features of Spring and Summer are and what happens to trees in this season (weather, animals, plants).** • I know when Spring and Summer occur. **<u>Animals, including humans:</u>** **I know that animals reproduce new animals when they reach maturity (offspring).** **I know that animals change as they grow into adults.** **I know that animals need water, food and air to survive.** **I know that exercise keeps animal's bodies in good condition and increases survival chances.** **I know that eating a balanced diet and having good hygiene helps to keep humans fit and healthy.**

	<u>Materials</u> **I know that everyday materials (e.g., wood, plastic, glass etc.) are suitable for different uses.** **I know that the shape of materials can be changed by physical force e.g., squashing, bending, twisting and stretching.**		
	Working scientifically continues throughout all topics		
Year B LKS2 Topic	**Light (Y3) Electricity (Y4)**	**States of matter (Y4)**	**Forces and magnets (Y3)**
Substantive dimension	**Physics**	**Chemistry**	**Physics**
KS2 Vocabulary	**LKS2** **Light:** light, light source, dark, absence of light, reflection, reflect, shadow, mirror, sunlight, dangerous, opaque, translucent, transparent, shiny/matt, surface **Electricity:** electricity, electrical appliance/device, mains Plug, electrical circuit, complete circuit, simple circuit, cell, wires, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, insulator, conductor, metal, symbol	**LKS2** **States of matter:** states of matter, solids, liquids, gases, state, change, heating, cooling, melting, freezing, melting point, boiling point, evaporation, condensation, temperature, water cycle	**LKS2** **Forces and magnets:** Force, push/pull/twist, contact force, non-contact force, magnetic force, magnet (bar, ring, button, horseshoe), strength, attract, repel, magnetic, surfaces, friction
Rationale	**Light:** Children's knowledge of light will be limited, however they will know that light effects how plants grow and how light changes over the seasons. Autumn term is an ideal time to study	**States of Matter:** Children will have learnt about different materials and their properties in KS1. This unit will build upon that and teach them about the different states of matter and how some	**Forces and Magnet:** Children will only have a very simplistic knowledge of forces and magnets before they begin this topic. It follows on from the work they

	light as the days draw in. Children will have the opportunity to investigate how light behaves and what constitutes a light source and what is reflective. **Electricity:** - follows on well from light although the children's knowledge will be limited to what they have used light for and the use of a switch to turn it off and on. Children will learn how to make a circuit and incorporate a switch which they will build upon in Years 5/6.	materials can be a solid, a liquid and a gas dependent on the temperature. This learning is key to future learning in years 5 and 6 about solutions and suspensions. 3.	have done on materials which will be useful when finding out which materials are magnetic. They will have the opportunity to investigate magnets and draw conclusions about what they have found. This work is crucial to the work on Earth and space that is taught in years 5 and 6. .
Key text	**<u>Nikola Tesla (Little People, Big Dreams)</u>** Maria Isabel Sanchez Vegara & Alexander Mostov		**<u>Why Doesn't the Moon Fall Down? And other questions about forces</u>** Anna Claybourne
Memorable experience.		Cake baking focus on changing state	Sky dome in school
LKS2 National Curriculum and Knowledge Blocks	**Key knowledge** **Light (Y3):** • 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. **Electricity (Y4)**	**Key knowledge** **States of matter (Y4):** • 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 **Knowledge blocks** **<u>States of matter</u>** I know that materials can be divided into solids, liquids and gases	**Key knowledge** **Forces and magnets (Y3):** • Compare how things move on different surfaces • Notice that some forces need contact between two 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 two poles

	• 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. • **Knowledge blocks** **<u>Light</u>** I know that light is created by a light source and that there must be light for us to see. Without light, it is dark. I know that some things are reflective, and this is not a light source but merely reflecting light from a source. I know that shiny materials reflect light beams better than non-shiny materials. I know the danger associated with looking directly at the sun, I know that a shadow is formed when light is blocked and that a shadow forms the shape of the item blocking it. I know that a shadow changes size when an object is moved closer or further away from the light source. **<u>Electricity</u>** I know that a source of electricity (mains appliance) is needed for electrical devices and can name some common appliances.	I know what makes a solid, a liquid and a gas and can give examples of all three. I know that some materials can change state when they are heated and that heating causes solids to melt into liquids and liquids evaporate into gases. I know that some materials change state when they are cooled and that cooling causes gases to condense into liquids and liquids to freeze into solids. I know the temperature that water boils and freezes. I know the meaning of evaporation and how this occurs. I know how scientists check for evaporation and the evidence that it has occurred. I know how condensation is formed I know the water cycle and can describe it using scientific language.	• Predict whether two magnets will attract or repel each other, depending on which poles are facing **Knowledge blocks** **Forces and magnets** I know that a force is a push or a pull. I know what friction is I know that the surface an object is on can change the way it moves. I know that most objects need direct contact with the force in order to move. I know that magnets attract and repel each other and the force can act without direct contact. I know the names of materials which are magnetic and others which are not. I know that magnets have a north and a south pole. I know that north and north poles of a magnet repel and north and south poles attract.

	I know how to make a simple series circuit using a cell and a bulb or a buzzer and use scientific vocabulary to describe it. I know how to record the circuit using pictorial representations. I know that a complete circuit is needed for electricity to flow and devices to work. I know what causes a circuit to fail and can predict if a circuit will light a bulb or not. I know the role of a switch and I can build circuits that contain a switch, explaining the effect of it being open or closed. I know that some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.		
Year B **UKS2 Topic**	**Light** **Electricity**	**Properties and changes of materials**	**Forces** **Earth and Space**
Substantive dimension	**Physics**	**Chemistry**	**Physics**
KS2 Vocabulary	**Light:** As for Y3: light, light source, dark, absence of light, reflection, reflect, shadow, mirror, sunlight, dangerous, opaque, translucent, transparent, shiny/matt, surface & straight lines, light rays **Electricity:** circuit, complete circuit, circuit diagram, symbols, cell, battery, current, bulb, buzzer, motor, switch, voltage	**Properties and changes of materials:** thermal/electrical, conductivity, insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	**Forces:** Earth, forces, gravity, Earth's gravitational pull, weight, mass, air resistance, water resistance, friction, simple machines, mechanism, lever, pulley, gears **Earth and Space:** Earth, sun, moon, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical solar system, rotates, star, orbit, geocentric, heliocentric

Rationale	**Light:** The light unit builds on learning in Years 3 and 4 which saw the children recognising that dark is the absence of light and that light can be reflected from surfaces. Children will have investigated how the size of a shadow is related to the distance from the light source. It will deepen their understanding of how light travels to which they will learn in much more depth at KS3. **Electricity**: The heavy focus on investigating the impact of the number of cells on the brightness of a bulb or the loudness of a buzzer in this unit means that children must have a firm understanding of how a circuit works. The ability to record their finding using more scientific diagrams prepares them for much more complex circuits in KS3/	**Properties of materials:** This is a content heavy unit so a full term is given over to it. Children have already sorted and classified materials and this unit will take that learning on further with more complex scientific concepts. Time will be given to investigating and drawing conclusions based on their own findings. This will prepare them for further work on separating materials at KS	**Forces and Earth and Space:** Forces is taught before Earth and Space to allow children to use their understanding of gravity to make sense of the Earth orbiting the sun and the moon's orbit of the Earth. Previously children have learnt about what a force is and magnetism which is crucial for their understanding of air resistance and when investigating forces. These topics lend themselves really well with our whole school topic 'Outer Space'
Key Text	**The bluest of blues**		**Cosmic** **The last thing**
Memorable experience		**Transition trip to Richmond School focus on changing materials**	Sky dome in school
KS2 Learning **National Curriculum and Knowledge Blocks.**	**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.	**Properties and changes of 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.	**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. **Earth and Space** • Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.

	Electricity (Y6) • 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. **Knowledge blocks** **Light:** **I know that light travels in straight lines.** **I know that objects ae seen because they give out or reflect light into the eye.** **I know that objects are seen as light travels to an object which then travels into the eye.** **I know that shadows are the same shape as the object blocking the light and this is because light travels in straight lines.** I know how the eye is structured and some of the key vocabulary associated with the eye. I know that I can change the direction of light using mirrors. **Electricity:** **I know recognised symbols when recording circuits in a diagram.** **I know the brightness of a bulb or loudness of a buzzer can be changed by adding or removing cells.** **I know why a circuit fails to light a bulb or ring a buzzer and can problem solve to make it work**	• 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 **Knowledge blocks** **Properties and changes of material:** • **I know different properties that can be used to group objects (hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets)** • **I know which materials are thermal insulators.** • **I know some materials which are soluble and insoluble** • **I know that materials can be separated by filtering, evaporation or sieving** • **I know why certain materials are used for certain things.** • **I know that dissolving can be a reversible change.** • **I know that some changes are irreversible.**	• 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. **Knowledge blocks** **Forces:** **I know that gravity pulls objects towards the earth. The same amount of force is exerted on all objects, large or small.** **I know that objects fall at different rates due to air resistance.** **I know that upthrust is what keeps items afloat in water.** **I know that friction acts between moving objects, but different surfaces can exert different amount of friction.** **I know that pulleys, levers and gears can show that a smaller force can have a greater effect.** **Earth and Space:** **I know the planets that make up our solar system and how they orbit the Earth at different rates.** **I know that it takes a day for the Earth to revolve once on its axis, a month for the moon to orbit the earth and a year for the Earth to orbit the sun.** **I know how the moon orbits the Earth and that this takes 28 days.** **I know that the moon is responsible for the tides and can explain about the phases of the moon.** I know that Stephen Hawking was a famous theoretical physicist who proposed the idea of the origins of the universe
Year C	**Living things and their habitat**	**Seasonal Change**	**Plants**

EYFS	Seasonal Change		Plants		Animals including humans Seasonal Change	
EYFS Knowledge Blocks	**3- and 4-year-olds** I can identify and name some animals and plants I can talk about where animals live I know about the life cycle of one animal **I can explore the natural environment and can talk about what I see, hear and feel** I can talk about different types of weather. I can talk about today's weather and talk about the clothes I might need to wear. I know about the changing season Autumn and can talk about what I see in Autumn e.g., different coloured leaves **Vocab**: animals, plants, live, life cycle, Autumn, cold, leaves, hibernate, boots, coat, wellies, rain, clouds	**Reception** I know that animals and plants live in different places I know 2 or more places where animals and plants live I can name animals and plants that live in these places I know about the food chain of one familiar animal **I know changes that occur in autumn – leaves changing colour, leaves falling from trees,** I know that the weather is turning colder in Autumn **Vocab:** habitat, different habitats e.g., woodland, rainforest, ocean etc. Different animals and plants, food chain, autumn, winter, leaves, colour, tree	**3- and 4-year-olds** I know where to find plants. **I know the names of some common plants e.g. grass, daisy, sunflower etc.** I can describe what plants look like I know about the life cycle of a plant. I know that plants need water to stay alive. I can talk about different types of weather. I can talk about today's weather and talk about the clothes I might need to wear. **Vocab:** plants, flower, water, survive, stay alive, weather, sunny, rainy, windy, snowy, boots, sunhat, sunglasses, hat, scarf, gloves	**Reception** **I can name some common plants and flowers that I can see in the environment** around me I know the basic parts of a plant (flower, stem, leaves, roots) and can locate these on a plant. I **know how to keep a plant alive** I know the key features of the life cycle of a plant. I know changes that occur in winter – cold, ice, frost, snow I know that the weather is turning colder in Winter **Vocab:** plants, flower, stem, leaves, roots, weather, warmer, colder, sunny, rainy, windy, snowy, Winter, Spring	**3- and 4-year-olds** I know where to find plants I know the names of some common plants e.g. grass, daisy, sunflower etc. I can describe what plants look like. I know about the life cycle of a plant. **I know that plants need water to stay alive.** I can sing songs to help me name some basic body parts e.g. heads, shoulders, knees and toes I can use vocabulary to describe what things look like, feel like, taste like, sound like and smell like I can talk about different types of weather. I can talk about today's weather and talk about the clothes I might need to wear. **Vocab**: plants, flower, water, survive, stay alive, head, shoulders, knees, toes, eyes, ears, mouth, nose, feel, smell, taste, look,	**Reception** **I know the basic parts of a plant (flower, stem, leaves, roots) and can locate these on a plant.** **I know the key features of the life cycle of a plant.** **I know that plants often grow from a seed and eventually form a flower.** I can name basic parts of the body (head, shoulders, eyes, ears, mouth, nose, legs, arms) I know my 5 senses – smell, taste, hear, touch, sight and can use words associated with the senses **I know changes that occur in Spring and Summer – weather getting warmer, sunshine, flowers blooming, animals being born etc.** I can notice changes in weather in Spring and Summer **Vocab:** plant, flower, stem, leaves, roots, life cycle, body, head, arms, legs, shoulders,

					sound, weather, sunny, rainy, windy, snowy, boots, sunhat, sunglasses, hat, scarf, gloves	stomach, weather, summer, warmer, holidays, season, Spring, Summer
Substantive dimension	**Biology**		**Biology**		**Biology**	
KS1 Vocabulary	**Living things and their habitats:** life processes, living, dead, never been alive, suited/suitable, basic needs, food, food chain, habitats, microhabitats, shelter, move, feed, names of local habitats e.g., pond, woodland, names of micro-habitats e.g., under logs, bushes etc. **Seasonal change:** Seasons (winter, spring, summer, autumn), weather (sunny, rainy, windy, snowy etc.), sun, sunrise, sunset, day length, temperature		**Seasonal change:** seasons (winter, spring, summer, autumn), weather (sunny, rainy, windy, snowy etc.), sun, sunrise, sunset, day length, temperature **Plants:** Wild plants, garden plants, weeds, deciduous tree, evergreen tree, leaves, flower, blossom, Petals, fruit, berry, roots, bulb, seed, stem/trunk, branches, bark, names of trees/plants in the local area		**Plants:** As for Y1 (see Spring) plue light, shade, sun, warm, cool, water, grow, healthy, germination **Animals, including humans:** Head, body, eyes, ears, mouth, teeth, leg, senses (touch, smell, see, hear, taste), fingers (skin), eyes, nose, ear, tongue, other parts of the body **Seasonal change:** Seasons (winter, spring, summer, autumn), weather (sunny, rainy, windy, snowy etc.), sun, sunrise, sunset, day length, temperature	
Rationale	Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. **Living things and their habitats:** Children will already have some experience of naming a variety of different plants and animals found in the environment around them. This topic		Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. **Plants:** Children will have already started to explore the environment around them in EYFS and will know about some similarities and differences in relation to living things.		Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. **Plants:** This topic builds upon the previous terms' learning on plant identification. Children will continue to identify and classify different plants	

	aims to build on this prior knowledge and allows children to start comparing plants and animals in different ways, not just by their name (alive, dead, never alive). Children will learn about a variety of different habitats and will explore how animals are suited to these – they will explore habitats in their local environment and compare the living things found here with animals found in larger environments e.g., rainforests. Alongside seasonal change, we will continue to look at habitats throughout the year so that we can build up a full picture of the animals in a habitat.	This topic aims to build on this prior knowledge and children will start to name and identify plants in their local environment as well as looking at the key characteristics of these plants and their structure. This topic follows on from LT&TH whereby children will have started to identify plants within different habitats. Although we will look at plants all year round (linked with seasonal change), this topic will be predominantly taught in the Spring term so that we can observe plants that are starting to grow in the local environment and start to plant our own in order to make observations over time.	as well as observe plants in the local environment. They will deepen their knowledge by focussing on what plants need to grow and stay healthy. If pupils encounter the Year 2 Plants topic as the first cycle, they would not have the necessary prior knowledge from the Year 1 topic to access the learning therefore it is important that this topic is taught after the Year 1 topic. This topic will be taught in the summer term when there is sufficient light in the classroom to grow plants. Children will also be given the opportunity to explore the bulbs that they planted in the Autumn term which can allow them to explore first-hand the life cycle of a plant. **Animals, including humans*:*** Children will have already started to explore similarities and differences between living things in EYFS. They will have had opportunities to make observations of animals and to explain why some things occur and talk about changes. This topic has been split into 2 sections and we will focus on the human aspect this half term. It is important to ensure that, as we teach this topic, children understand that humans are animals. Children will learn about the different parts of the human body and will explore how their senses are linked to particular body parts. Both the 'plants' and 'animals, including humans' topic can be supported by the DT topic 'food' where we will grow and prepare our own fruit and vegetables.
Key Texts	Where is my home? by Lucy Parrianan		Wild The Great Kapok Tree

Memorable experience	Plant a broken dragon egg in the classroom. Footsteps leading away, children to follow the trail and discover what happens next.	Walk in the locality looking for signs of spring	A trip to the Life centre Newcastle
KS1 Key National Curriculum and Knowledge Blocks	**Seasonal change (Y1)** • Observe changes across the four seasons and describe the difference • Observe and describe weather associated with the seasons and how day length varies **Living things and their habitats (Y2)** • 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 micro-habitats • 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 <u>Seasonal change</u> **I know what the features of Autumn and Winter are and what happens to trees in this season (weather, animals, plants).** I know that Autumn and Winter are seasons of the year. I know when Autumn and Winter occurs. <u>Living things and their habitats</u> **I know the differences between things that are alive, dead and things that have never been alive.**	**Seasonal change (Y1)** • Observe changes across the four seasons and describe the difference • Observe and describe weather associated with the seasons and how day length varies **Plants (Y1)** • 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 **Seasonal change** • **I know what the features of Winter and Spring are and what happens to trees in this season (weather, animals, plants).** • I know that Winter and Spring are seasons of the year. • I know when Winter and Spring occurs. <u>Plants: (Y1)</u> **I know what wild and garden plants are and can name a variety of common wild and garden plants.** **I know the different parts of a plant including roots, stem, leaves, flower, petals, trunk, branches, fruit.** **I know the names of common trees (beech, oak, ash)** **I know the difference between evergreen and deciduous trees and can identify different evergreen and deciduous trees.** I know that plants are grown from seeds or bulbs. I know that we can eat different plants in the form of fruit and vegetables.	**Seasonal change (Y1)** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies **Plants (Y2)** • 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 **Animals, including humans (body – senses) (Y1)** • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense <u>Seasonal change</u> **I know what the features of Spring and Summer are and what happens to trees in this season (weather, animals, plants).** I know that Spring and Summer are seasons of the year. I know when Spring and Summer occurs. <u>Plants (Y2)</u> **I know that plants can grow from either seeds or bulbs.** **I know that plants need water, light, and a suitable temperature to grow and survive.** **I know that seeds and bulbs germinate and then grow into seedlings and then continue to grow into mature plants – plant life cycle.**

	I know what a habitat is and can name habitats in my local area e.g., woodland, pond, grass etc. as well as habitats around the world e.g. rainforest. **I know that living things live in habitats to which they are suited and I know that habitats provide for the basic needs of animals e.g., shelter, space to move and grow, food and water.** **I know the names of a variety of animals and plants that live in different habitats, including in microhabitats.** **I know how animals obtain food from plants and other animals and can represent this in a food chain.**		I know that seeds and bulbs need to be planted at different times of the year and will germinate and grow at different rates. **Animals, including humans (body – senses)** **I know the names of different parts of the human body including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth** **I know the 5 senses associated with the human body – touch, smell, hear, taste, sight** **I know which part of the body is associated with each sense.**
	Working scientifically continues throughout all topics		
Year C **LKS2 Threads**	**Plants (Y3)** **Living things and their habitats (Y4)**	**Rocks (Y3)** **Sound (Y4)**	**Animals, including humans (Y3 & 4)**
Substantive dimension	**Biology**	**Physics** **Earth Sciences**	**Biology**
LKS2 Vocabulary	**Plants:** roots, stem/trunk, leaves, flowers, air, light, water, nutrients, transportation, life cycle, photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind, animal, water) **Living things and their habitats:** classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	**Rocks:** rocks, stone, pebble, boulder, grain, crystals Layers, hard/soft, texture, absorb, water, soil, fossil **Sound:** Sound, source, sound wave, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation	**Animals, including humans (Y3):** Nutrition, nutrients, carbohydrates, protein, sugars, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine **Animals, including humans (Y4):** digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, nutrients, rectum, anus, teeth – incisor, canine, molar, premolar

Rationale	**Plants** : Have an annual cycle at different times of the year so changes should be observed throughout the year. Children have already observed and planted seeds during their work in KS1, this work will deepen their understanding of the functions of the different parts of a plant and their lifecycle. Living things - Following on from this, children will be able to used their learning about plants and begin to classify plants and animals into groups and link their work on plants to what problems changes to their environment may cause.	**Rocks:** Although children do not study rocks previously, they do understand different materials and their properties. This unit is key in preparing them for their work on evolution and inheritance in years 5 and 6. Sound – This unit builds on the children's general understanding of objects making different sounds and the ear being. It is a reasonably short unit of work so works well with rocks as another short unit.	**Animals including humans:** This unit is taught after plants and living things so the children can utilise their knowledge of both when learning about food chains and grouping and classifying animals. Their understanding of nutrients in plants will help them when learning about the digestive system in humans. They can link their knowledge of teeth to classifying animals into herbivores and omnivores.
Key Text	Botanicum	The street beneath my feet	World of food
Memorable experience	Forest School	Drumming workshop	A trip to the life centre Newcastle
LKS2 Key knowledge	**Plants (Y3):** • 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	**Rocks (Y3)** • 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. **Sound (Y4)** • 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	**Animals, including humans (Y3)** • 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. **Animals, including humans (Y4)** • 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

	and seed dispersal. **Living things and their habitats (Y4)** • 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 **<u>Plants</u>** **I know the names of different parts of the plant and can describe the function of these parts (stem/trunk; leaves and flowers).** **I know that plants have roots to provide support and to draw moisture from the soil, through stems to take water to the rest of the plant.** **I know that seeds/bulbs require the correct conditions to germinate and grow and that these differ from plant to plant (air, light, water, nutrients from soil, room to grow).** I know that flowering plants have evolved specific parts to carry out pollination, fertilisation and seed production. I know that seed dispersal improves a plants chances of successful reproduction. I know that plants are producers and that they make their own food. • I know that the leaves absorb sunlight and carbon dioxide. **<u>Living things and their habitats</u>** **I know that living things can be divided into groups based on their characteristics e.g., flowering and non-flowering plants, vertebrate and invertebrate etc.**	• 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 **<u>Rocks</u>** **I know that there are different types of rock.** **I know that fossils are made when things that have lived are trapped within rocks.** **I know that soil is made when things that have lived are trapped within rocks.** **I know that there are different types of soil.** **I know that fossils provide evidence that living things have changed over time** I know that palaeontologists use fossils to find out about the past. **<u>Sound</u>** **I know that sound is produced when an object vibrates.** **I know that sound travels through the air in soundwaves to the ear which vibrates our ear drum.** **I know you can change the volume and pitch of a sound.** **I know bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds** **I know faster vibrations produce higher pitched sounds** **I know that the further away a sound is produced, the fainter it sounds to us (sound travel can be blocked || sound spreads out as it travels)**	• Construct and interpret a variety of food chains, identifying producers, predators and prey. **<u>Animals including humans - Y3</u>** **I know that all animals, humans included need nutrients to survive and that foods are organised into food groups.** **I know that many animals have skeletons to support their bodies and protect vital organs.** **I know that muscles are connected to bones and move when they contract and that movable joints connect bones.** **I know what makes an invertebrate and a vertebrate.** **I know the names of some of the main bones of the human skeleton.** I know that different foods have different nutritional values and that the correct amount of each constitutes a balanced diet. I know that different animals are adapted to eat different foods. **<u>Animals including humans - Y4</u>** **I know the names of internal organs linked to the digestive system and can use these to describe how the body digests food.** **I know the names of the different types of teeth in our mouths and know the different jobs that these teeth do.** **I know how to sort animals into different groups to classify them and use this to construct a food chain**. **I know what producers, predators and prey are.**

	I know that classification keys can be used to help group and name livings things **I know that environmental change affects habitats differently.** **I know that different organisms are affected by environmental change differently.** I know that human activity can significantly affect the environment (both positively and negatively).		
	Working scientifically continues throughout all topics		
Year C UKS2	**Living things and their habitats (Y5 & 6**	**Evolution and Inheritance (Y6)**	**Animals, including humans (Y5 & 6)**
Substantive dimension	**Biology**	**Biology**	**Biology**
UKS2 Vocabulary	**Living things and their habitats (Y5):** life cycle, reproduce, reproduction, sexual, sperm, fertilise, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings **Living things and their habitats (Y6):** vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering	**Evolution and Inheritance:** offspring, sexual reproduction, vary/variations, identical, inheritance/inherited, characteristics, suited, adapted, evolution, environment, species, fossils	**Animals, including humans (Y5):** Baby, toddler, teenager, elderly, growth, fertilisation, prenatal, foetus, gestation, Reproduce, asexual reproduction, sexual reproduction, cell, pregnancy, life cycle, puberty, adolescence, menstruation, adulthood, life expectancy **Animals, including humans (Y6):** circulatory system, oxygen, heart, lungs, blood, blood vessels, nutrients, water, muscles, diet, exercise, drug, alcohol, lifestyle
Rationale	Children have previously learnt about classifying animals into distinct groups which is key to then learning about the different groups' lifecycles in this unit. Further work on classifying will cement their understanding of diverse groups and expand their understanding of this. The work on reproduction will be built upon in the next unit of work 'Evolution and Inheritance'	This work builds on previous work on rocks and fossils that the children studied in years 3 and 4. It links to the previous term's work on reproduction of living things and builds upon that, digging deeper into how plants/animals evolve over time and inherit characteristics from their parents. It will prepare them for work in KS3 on genes and DNA.	Before learning about the lifecycle of humans, it is important that children have an understanding of the lifecycle of animals which they learnt earlier this year. Having previously learnt about the digestive system, children are well placed to now begin to look in more depth about the workings of our heart and lungs. This in turn prepares them well for KS3 when they will look in more depth at these topics.
Key Text	**Habitats Hannah Pang & Isobel Lundie**	**The street beneath my feet**	**Anatomicum**

Memorable experience			
UKS2 National Curriculum and Key knowledge	**Living things and their habitats (Y5)** • 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. **Living things and their habitats (Y6)** • 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. **<u>Living things and their habitats</u>** **I can compare the differences in the lifecycle of a mammal, an amphibian, an insect and a bird** **I know the reproductive process of animals.** **I can explain the reproductive process of a flowering plant.** **I know the reproductive process of non-flowering plans such as ferns and fungi.** **I know the work of key scientists such as David Attenborough and Marie Clark.** **I know what a micro-organism is and can name some examples.** **I know the characteristics of different micro-organisms, plants and animals** **I know how to group micro-organisms, plants and animals and can justify** I can explain the impact of climate change on plants and animals. I know the different animal groups and can explain how this helps me to better understand them. I know the impact of invasive species on an eco-system such as the Florida everglades.	**Evolution and inheritance (Y6):** • 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 **<u>Evolution and inheritance</u>** **I know about how a palaeontologist works and how evidence is gathered.** **I know that family traits are inherited/passed down from parents and grandparents.** **I know how animals are specifically adapted to suit their habitat.** **I know that scientists believe humans evolved from apes to modern homo sapiens.** **I know that Charles Darwin discovered evolution of the species through his observational work.** I know about the importance of the finds of Mary Anning (the mother of palaeontology) I know that dogs can be bred to select the most desirable genes from different breeds I know how the peppered moth changed during the industrial revolution to ensure its survival. I know the shape of the beaks of finches can affect the types of seed/nut it eats.	**Animals, including humans (Y5)** • Describe the changes as humans develop to old age. **Animals, including humans (Y6)** • 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 **<u>Animals including humans</u>** **I know and can describe the changes that we go through as we age.** **I know the names of the main parts of the circulatory system.** **I know what the function of the heart, blood vessels and blood is.** **I know how our body uses the food and water we intake in terms of nutrients in our body and how these are transported around the body and the body of other animals.** **I know the impact of drugs and alcohol on the human body** I know how we use the oxygen we breathe in. I know the nutritional value of some food and the impact of an unhealthy diet.

	Working scientifically continues throughout all topics					
Year D KS1 and EYFS Threads	**Materials**		**Seasonal Change Animals including humans**		**Animals including humans**	
EYFS Knowledge Blocks	**<u>3- and 4-year-olds:</u>** I know that not all objects feel the same **I can describe how objects feel and look e.g., hard/soft, colourful etc.** **Vocab:** hard, soft, squashy, fluffy, bumpy, smooth, colourful	**<u>Reception:</u>** I know objects are made from materials **I know the names of at least 2 different materials** I know words to describe different materials e.g., hard, soft, heavy, light etc. I know that materials can be changed e.g., through melting/freezing **Key vocab:** material, plastic, wood, glass, metal, paper, hard, soft, heavy, light, melting, freezing, float, sink	**<u>3- and 4-year-olds:</u>** I know that there are different types of weather I can talk about today's weather and talk about the clothes I might need to wear I know that there are lots of different animals **I know the names of some animals** I know words to describe what an animal looks like **Vocab:** weather, sun, rain, wind, snow, hat, sunglasses, boots, coat, scarf, gloves, animals, dog, cat, horse, cow, sheep, big, small, fluffy, fur, paws, horns, tail	**<u>Reception:</u>** I **know that Winter is one of the 4 seasons** **I know that changes occur in winter e.g. cold, frost, ice, snow** I know that the temperature is colder in the winter I know what an animal is I know the name of some common animals e.g., farm animals, pets I know that some animals can be kept as pets I can describe what an animal looks like and talk about some of its body parts e.g., head, leg, tail, paws etc. **Vocab:** season, winter, weather, cold, sun, rain, wind, snow, temperature, frost, ice, day length, animal, cat, dog, horse, cow, sheep, pet, head, leg, tail, paw, fur, ears, horns, beak (& other animals/body parts)	**<u>3- and 4-year-olds:</u>** I know that there are lots of different animals **I know the names of some animals** I know about the life cycle of an animal e.g., a butterfly I know that I need to wash my hands to stops germs from spreading I know that some foods are healthier than others **Vocab:** animals, dog, cat, horse, cow, sheep, butterfly, germs, poorly, clean, healthy	**<u>Reception</u>** I know that animals have babies I know about the life cycle of a human I can talk about how I have changed since I was a baby I know that I need water, air and food to survive **I know some ways to keep myself healthy e.g., food choices, exercise, sleep, tooth brushing etc.** **Vocab:** mum, baby, life cycle, human, changes, adult, young, old, water, air, food, survive, healthy, sleep, tooth brushing, exercise
Substantive dimensions	**Physics**		**Biology**		**Biology**	
KS1 vocabulary	**Y1 materials:** object, names of material e.g., wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, cardboard/card, rubber, wool, clay, properties, hard/soft, stretchy/stiff, shiny/dull, see-through,		**Seasonal change:** seasons (winter, spring, summer, autumn), weather (sunny, rainy, windy, snowy etc.), sun, sunrise, sunset, day length, temperature		**Animals, including humans:** offspring, reproduction, growth, child, young/old stages (e.g., chick/hen, baby/child/adult, caterpillar/butterfly), exercise, energy, nutrition, heartbeat, breathing, hygiene, germs, disease,	

	not see-through, rough/smooth, bendy/floppy, waterproof/not waterproof, absorbent/not absorbent, breaks/tears **Y2 materials:** **names** of materials e.g., wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, cardboard/card, rubber, wool, clay, **properties** of materials – as for year 1 plus opaque, transparent, translucent, reflective/non-reflective, flexible, rigid, Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching	**Animals, including humans (animals):** head, body, eyes, ears, mouth, nose, ear, tongue, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, animals experienced first-hand from each vertebrate group	food types (e.g., meat, fish, vegetables, bread, rice, pasta)
Rationale	Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. **Materials:** Children will have already started to explore similarities and differences between different objects and materials in EYFS. In this topic, children will distinguish the differences between an object and the material from which it is made and will start to describe the materials using more scientific vocabulary. The Y2 materials topic follows on from the Y1 topic. This allows for clear progression of knowledge/skills and enables children to effectively build upon their prior learning. The children will deepen their learning by exploring the suitability of different materials for particular uses – using the properties of these materials to justify their decision making. If pupils encounter the Year 2 Everyday materials topic as the first cycle, they would not have the	Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. **Animals, including humans:** Children will have already started to explore similarities and differences between living things in EYFS. They will have had opportunities to make observations of animals and to explain why some things occur and talk about changes. This topic has been split into 2 sections and we will focus on the 'animals' aspect this half term where children will learn to identify different animals from different groups and will describe and compare the structure of said animals.	Seasonal change will need to be observed regularly throughout the year. Children will make observations about the weather and how this affects living things. **Animals, including humans:** This unit will follow directly on from the Year 1 learning the previous term. They will know the names of many animals and begin to link they key learning that all living things need water, food and air to survive. They will develop their understanding of what animals need to survive from the previous term and link that to a humans need for a varied diet and the importance of regular exercise.

	necessary prior knowledge from the Year 1 topic to access the learning therefore it is important that the Year 2 topic follows the Year 1 topic.		
Key Texts	Iggy Peck Architect	**<u>Tree: Seasons Come, Seasons Go</u>** Patricia Hegarty & Britta Teckentrup	**<u>Monkey Puzzle</u>** Julia Donaldson & Axel Scheffler
Memorable experience	Build a tower or Lego creation (with a partner they wouldn't normally work with) then do a Lego museum display for parents where work can be showcased.		**Trip to local farm to see lambing (may be spring term depending on easter**
KS1 Learning Key Knowledge	**Seasonal change:** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies **Materials (Y1):** • 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. **Materials (Y2):** • 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. **<u>Seasonal change:</u>**	**Seasonal change:** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies **Animals, including humans (animals) (Y1):** • 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) **<u>Seasonal change:</u>** **I know that Winter and Spring are seasons of the year.** **I know what the features of Winter and Spring are and what happens to trees in this season (weather, animals, plants).** I know when Winter and Spring occur. **<u>Animals, including humans (animals):</u>** **I know the names of some common animals including fish, amphibians, reptiles, birds and mammals.** **I know that there are many different groups of animals have different characteristics.**	**Seasonal change:** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies **Animals, including humans (Y2):** • 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 **<u>Seasonal change:</u>** **I know that Spring and Summer are seasons of the year.** **I know what the features of Spring and Summer are and what happens to trees in this season (weather, animals, plants).** I know when Spring and Summer occur. **<u>Animals, including humans:</u>** **I know that animals reproduce new animals when they reach maturity (offspring).**

	I know that Autumn and Winter are seasons of the year. **I know what the features of Autumn and Winter are and what happens to trees in this season (weather, animals, plants).** I know when Autumn and Winter occur. **<u>Materials</u>** **I know what a material is.** **I know that objects are made from different materials and can identify the material that objects are made from.** **I know that materials have different properties.** **I know that different materials have different properties.** **I know that materials can be grouped depending upon their property.** **<u>Materials</u>** **I know that everyday materials (e.g., wood, plastic, glass etc.) are suitable for different uses.** **I know that the shape of materials can be changed by physical force e.g., squashing, bending, twisting and stretching.**	**I know that animals can be grouped in different ways e.g., fish, amphibians, reptiles, birds and mammals.** **I know that different animals eat different types of food and that animals can be described as carnivores, herbivores and omnivores.** I know that animals need a variety of food to help them grow, repair their bodies, stay active and stay healthy.	**I know that animals change as they grow into adults.** **I know that animals need water, food and air to survive.** **I know that exercise keeps animal's bodies in good condition and increases survival chances.** **I know that eating a balanced diet and having good hygiene helps to keep humans fit and healthy.**
	Working scientifically continues throughout all topics		
Year D LKS2 Topic	**Light (Y3) Electricity (Y4)**	**States of matter (Y4)**	**Forces and magnets (Y3)**
Substantive dimensions	**Physics**	**Chemistry**	**Physics**
KS2 Vocabulary	**Light:** Light, light source, dark, absence of light, reflection, reflect, shadow, mirror, sunlight, dangerous,	**States of matter:** States of matter, solids, liquids, gases, state, change, heating, cooling, meting, freezing, melting point, boiling	**Forces and magnets:** Force, push/pull/twist, contact force, non-contact force, magnetic force, magnet (bar, ring,

	opaque, translucent, transparent, shiny/matt and surface. **Electricity:** Electricity, electrical appliance/device, mains Plug, electrical circuit, complete circuit, simple circuit, cell, wires, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, insulator, conductor, metal and symbol.	point, evaporation, condensation, temperature and water cycle.	button, horseshoe), strength, attract, repel, magnetic, surfaces and friction.
Rationale LKS2	**Light:** Children's knowledge of light will be limited, however they will know that light effects how plants grow and how light changes over the seasons. Autumn term is an ideal time to study light as the days draw in. Children will have the opportunity to investigate how light behaves and what constitutes a light source and what is reflective. **Electricity:** This unit follows on well from light although the children's knowledge will be limited to what they have used light for and the use of a switch to turn it off and on. Children will learn how to make a circuit and incorporate a switch which they will build upon in Years 5/6.	**States of matter:** Children will have learnt about different materials and their properties in KS1. This unit will build upon that and teach them about the different states of matter and how some materials can be a solid, a liquid and a gas dependent on the temperature. This learning is key to future learning in years 5 and 6 about solutions and suspensions.	**Forces and Magnets:** Children will only have a very simplistic knowledge of forces and magnets before they begin this topic. It follows on from the work they have done on materials which will be useful when finding out which materials are magnetic. They will have the opportunity to investigate magnets and draw conclusions about what they have found. This work is crucial to the work on Earth and space that is taught in years 5 and 6.
Key Texts	**Nikola Tesla (Little People, Big Dreams)** Maria Isabel Sanchez Vegara & Alexander Mostov		**Why Doesn't the Moon Fall Down? And other questions about forces** Anna Claybourne
Memorable experience		**Cake baking focus on changing state**	Sky dome in school

LKS2 National Curriculum and Knowledge Blocks	**Key knowledge** **Light (Y3):** • 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. **Electricity (Y4)** • 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. • **<u>Light</u>** **I know that light is created by a light source and that there must be light for us to see. Without light, it is dark.** **I know that some things are reflective, and this is not a light source but merely reflecting light from a source.**	**Key knowledge** **States of matter (Y4):** • 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 **<u>States of matter</u>** **I know that materials can be divided into solids, liquids and gases** **I know what makes a solid, a liquid and a gas and can give examples of all three.** **I know that some materials can change state when they are heated and that heating causes solids to melt into liquids and liquids evaporate into gases.** **I know that some materials change state when they are cooled and that cooling causes gases to condense into liquids and liquids to freeze into solids.** **I know the temperature that water boils and freezes.** **I know the meaning of evaporation and how this occurs.** **I know how condensation is formed** **I know the water cycle and can describe it using scientific language.**	**Key knowledge** **Forces and magnets (Y3):** • Compare how things move on different surfaces • Notice that some forces need contact between two 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 two poles • Predict whether two magnets will attract or repel each other, depending on which poles are facing **<u>Forces and magnets</u>** **I know that a force is a push or a pull.** **I know what friction is** **I know that the surface an object is on can change the way it moves.** **I know that most objects need direct contact with the force in order to move.** **I know that magnets attract and repel each other and the force can act without direct contact.** **I know the names of materials which are magnetic and others which are not.** **I know that magnets have a north and a south pole.** **I know that north and north poles of a magnet repel and north and south poles attract.**

	I know that shiny materials reflect light beams better than non-shiny materials. **I know the danger associated with looking directly at the sun,** **I know that a shadow is formed when light is blocked and that a shadow forms the shape of the item blocking it.** **I know that a shadow changes size when an object is moved closer or further away from the light source.** **<u>Electricity</u>** **I know that a source of electricity (mains appliance) is needed for electrical devices and can name some common appliances.** **I know how to make a simple series circuit using a cell and a bulb or a buzzer and use scientific vocabulary to describe it. I know how to record the circuit using pictorial representations.** **I know that a complete circuit is needed for electricity to flow and devices to work.** **I know what causes a circuit to fail and can predict if a circuit will light a bulb or not.** **I know the role of a switch and I can build circuits that contain a switch, explaining the effect of it being open or closed.** **I know that some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.**		
	Working scientifically continues throughout all topics		
UKS2	**Light (Y6)** **Electricity (Y6)**	**Properties and changes of materials (Y5)**	**Forces (Y5)** **Earth and Space (Y5)**
Substantive dimensions	**Physics**	**Chemistry**	**Physics**

KS2 Vocabulary	**Light:** As for Y3: light, light source, dark, absence of light, reflection, reflect, shadow, mirror, sunlight, dangerous, opaque, translucent, transparent, shiny/matt, surface & straight lines and light rays. **Electricity:** Circuit, complete circuit, circuit diagram, symbols, cell, battery, current, bulb, buzzer, motor, switch and voltage.	**Properties and changes of materials:** Thermal/electrical, conductivity, insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting and new material.	**Forces:** Earth, forces, gravity, Earth's gravitational pull, weight, mass, air resistance, water resistance, friction, simple machines, mechanism, lever, pulley and gears. **Earth and Space:** Earth, sun, moon, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical solar system, rotates, star, orbit, geocentric and heliocentric.
Rationale	**Light:** The light unit builds on learning in Years 3 and 4 which saw the children recognising that dark is the absence of light and that light can be reflected from surfaces. Children will have investigated how the size of a shadow is related to the distance from the light source.	**Properties and changes of materials:** This is a content heavy unit so a full term is given over to it. Children have already sorted and classified materials and this unit will take that learning on further with more complex scientific concepts. Time will be given to investigating and drawing conclusions based on their own findings. This will prepare them for further work on separating materials at KS3.	**Forces:** Forces is taught before Earth and Space to allow children to use their understanding of gravity to make sense of the Earth orbiting the sun and the moon's orbit of the Earth. Previously children have learnt about what a force is and magnetism which is crucial for their understanding of air resistance and when investigating forces.
Key Texts	**The bluest of blues**		**Cosmic** **The last thing**
Memorable experience		**Transition trip to Richmond School focus on changing materials**	Sky dome in school
KS2 Learning **National Curriculum and Knowledge Blocks.**	**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.	**Properties and changes of 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.	**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.

	• Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. **Electricity (Y6)** • 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. **<u>Light:</u>** **I know that light travels in straight lines.** **I know that objects ae seen because they give out or reflect light into the eye.** **I know that objects are seen as light travels to an object which then travels into the eye.** **I know that shadows are the same shape as the object blocking the light and this is because light travels in straight lines.** I know how the eye is structured and some of the key vocabulary associated with the eye. I know that I can change the direction of light using mirrors. **<u>Electricity:</u>** **I know recognised symbols when recording circuits in a diagram.** **I know the brightness of a bulb or loudness of a buzzer can be changed by adding or removing cells.** **I know why a circuit fails to light a bulb or ring a buzzer and can problem solve to make it work**	• 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 **<u>Properties and changes of material:</u>** **I know different properties that can be used to group objects (hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets)** **I know which materials are thermal insulators.** **I know some materials which are soluble and insoluble** **I know that materials can be separated by filtering, evaporation or sieving** **I know why certain materials are used for certain things.** **I know that dissolving can be a reversible change.** **I know that some changes are irreversible.**	**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. **<u>Forces:</u>** **I know that gravity pulls objects towards the earth. The same amount of force is exerted on all objects, large or small.** **I know that objects fall at different rates due to air resistance.** **I know that upthrust is what keeps items afloat in water.** **I know that friction acts between moving objects, but different surfaces can exert different amount of friction.** **I know that pulleys, levers and gears can show that a smaller force can have a greater effect.** **<u>Earth and Space:</u>** **I know the planets that make up our solar system and how they orbit the Earth at different rates.** **I know that it takes a day for the Earth to revolve once on its axis, a month for the moon to orbit the earth and a year for the Earth to orbit the sun.** **I know how the moon orbits the Earth and that this takes 28 days.** **I know that the moon is responsible for the tides and can explain about the phases of the moon.**

			I know that Stephen Hawking was a famous theoretical physicist who proposed the idea of the origins of the universe
	Working scientifically continues throughout all topics		