Science Curriculum Map

Biology	Chemistry	Physics

	Autumn		Spring		Summer	
	Cycle A	Cycle B	Cycle A	Cycle B	Cycle A	Cycle B
Reception	Human body		Motion and forces (transport)		Plants	
	Seasonal changes		Animals		Materials	
KS1	Seasonal changes Y1	**Everyday materials Y1+2**	**Everyday materials Y1+2**	**Animals including humans (animal focus Y1+2)**	**Plants Y1+2**	Living things and their habitats Y2
	Animals including humans (human focus Y1+2)	**Animals including humans (human focus Y1+2)**			**Animals including humans (animal focus Y1+2)**	**Plants Y1+2**
LKS2	Animals including humans (nutrition) Y3 POS)	Rocks (local exploration) Y3	Light Y3	Electricity Y4	Plants Y3	Forces and magnets Y3
	Living things and habitats (local focus) Y4	Animals including humans (human focus digestion and teeth Y4 POS)	Sound Y4	States of matter Y4	Animals including humans (animal focus – skeletons etc) Y3	Plants Y3
UKS2	Animals including humans Y5	Animals including humans Y6	Light Y6	Forces Y5	Living things and habitats Y5	Living things and habitats Y6

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	Evolution and inheritance Y6		Properties and changes of materials Y5	Electricity Y6	Earth and space Y5	

CYCLE A		Retrieval	Knowledge	Skills Y1	Skills Y2	Suggested outcomes	Vocabulary	Linked texts
KS1	Autumn	Observation of seasons in Reception Key Qs: What clothes did you wear when it was cold or hot? What did trees look like in autumn or winter? When did you notice the days getting darker earlier? What activities can you do in autumn/winter, spring/summer?	**Seasonal changes (Y1 POS)** NC objectives: **observe changes across the 4 seasons** **observe and describe weather associated with the seasons and how day length varies** I know that the weather, plants and trees change in each of the four seasons. I know that each season has different types of weather, like sunshine, rain, wind or snow. I know that days are longer in summer and shorter in winter. Linked scientist: Wilson Bentley – first to photograph snowflakes	I can look closely at the weather and the world around me and record what I see. I can notice and describe simple changes across the seasons. I can talk about what happened using simple words and pictures (sunny, rainy, windy, darker, lighter).	I can make careful observations of weather and day length and choose how to record them (table or simple chart). I can look for patterns in seasonal changes, such as colder days in winter or longer days in summer. I can use my results to describe what changed using words like increase, decrease, similar and different.	USE EXPLORIFY FOR STARTERS – DISCUSSION POINTS/RETRIEVAL Choose a tree and track it through the seasons – observational drawings, labels DEVELOPING EXPERTS Understand that there are 4 seasons – look at features of each one; sort activities based on the time of year – clothes, festivals linked to seasons Look at key changes in autumn, winter, spring and summer (1x lesson each on DE); create collage pictures of each season, e.g. plants Complete weather diary – use basic equipment to measure temperature, rain levels – Y2 record results using simple tables – compare a day at the start of the unit, and end of unit Compare hours of sunlight in each month – Y2 chart Day length in summer KS1 | Y1 Science | Lesson Resources | Oak National Academy	**season** **weather** **temperature** **rainfall** **daylight** **sunrise / sunset**	*The Human Body* *Oliver's Vegetables* *Ada Twist, Scientist* *Funnybones* *My Body* *The Tree* *The Oak Tree* *A Year in the City* *Seasons*

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		Human body covered in Reception Key Qs: What body parts do you remember learning about? Which senses do you use to explore things? What foods help you stay healthy? Why do we wash our hands? What exercises can you do to keep fit? How has your body change as you grow?	**Animals including humans:** NC objectives: **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** **Y2 - describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene** Y1: **I know the names of the main parts of my body** (head, arms, legs, hands, feet, eyes, ears, nose, mouth). **I know that each sense is linked to a body part** (eyes see, ears hear, nose smells, tongue tastes, skin feels). **I know how to draw and label a simple picture of the human body** Y2: **I know that exercise keeps my body healthy**, helping my heart, muscles and lungs to work well. **I know that I need a balanced diet**, with the right amounts of different types of food to give me energy and help me grow. **I know that good hygiene keeps me safe from germs**, and that washing, brushing teeth and keeping clean help prevent illness. Linked scientist: Dr. Elsie Widdowson – nutrition scientist	Y1 I can look closely at my body and senses and draw what I see. I can ask simple questions about my body and senses I can talk about what I noticed using simple words and pictures.	Y2 I can ask questions about keeping healthy and suggest how to find answers. I can do simple tests to compare what happens when I exercise or keep clean (teeth – sugar?) I can record my results in a table or chart and say what changed.	USE EXPLORIFY FOR STARTERS – DISCUSSION POINTS/RETRIEVAL Draw and label human body – Y2s locate heart, lungs and core muscles linked to exercise study Use equipment to observe and investigate human body at different levels: Y1/Y2 measure hands/feet to compare how foot/hand size relate (Y1 non-standard measure, Y2 rulers) Y1 mirrors to observe eyes/nose/mouth – draw and label linked to each sense/Y2 mirrors to map teeth – link to teeth-brushing hygiene Y2 timers to time exercises (lesson input linked to touch/feeling sense) and measure heartrate – link to benefits of exercise to stay healthy Investigate hand-washing – linked to touch (soap and pepper experiment) Investigate what makes a healthy plate (Y1s taste testing, Y2s classifying foods and creating healthy plate	Y1 **body** **senses** **eyes** **ears** **nose** **touch** Y2 **exercise** **healthy** **hygiene** **germs** **heart rate** **balanced diet**	

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	Spring	Materials covered in Reception/Y1: Key Qs:	**Everyday Materials** NC objectives: **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** **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** Y1: **I know the difference between an object and the material it is made from.** **I know the names of everyday materials**, including wood, plastic, glass, metal, water and rock. **I know that materials have different physical properties** and can be described, compared and grouped by these properties. Y2: **I know that everyday materials include wood, metal, plastic, glass, brick, rock, paper and cardboard.** **I know that different materials are suitable for different uses** because of their properties. **I know that the shapes of some solid objects can be changed** by squashing, bending, twisting and stretching.	Y1 I can observe and identify everyday materials using my senses. I can describe, compare and group materials according to their simple physical properties. I can ask simple questions and carry out simple tests to explore the properties of materials.	Y2 I can ask questions and carry out simple comparative tests to investigate which materials are most suitable for different purposes. I can observe and investigate how solid objects change shape when squashed, bent, twisted or stretched. I can gather and record results from my investigations and use my observations to explain my findings.	USE EXPLORIFY ACTIVITIES FOR STARTERS Carry out a 'materials hunt' around the school – what is each object made out of? Y1s have labels with their core materials – place the labels on physical objects. Y2s fill in a table to show what materials they find in their surroundings - extend with why they think it's a good material for its purpose, e.g. why is wood suitable for a table? Natural/manmade materials – take the material hunt outside and look for natural materials. What objects can be made from the materials you find? Y1 complete sorting activity into natural/manmade, Y2s Explore properties of materials – use hoops to categorise a selection of materials using properties including soft, smooth, hard, rough, flexible, transparent (extend Y2s with rigid, opaque). Chn use senses to identify properties – can more than 1 material have the same property? Y1s then sort a range of materials (either by labelling them with the property, or putting them into a labelled hoop). Y2s think about the uses of the materials based on their properties – e.g. why is glass a suitable material for a window? Pose challenge questions, e.g. would you make a jumper out of wood? Why/why not? Ask chn to explain. Investigate properties of materials – Y1 use their senses to identify which properties a range of materials has. Provide a simple ticklist – chn tick off which properties each material has. Y2s have a range of materials and checklist for whether those materials can be squashed, bent, twisted or stretched. Give chn box at the end to discuss what happens to the material once they've been changed – do they go back or do they stay the new shape? Explore different kinds of fabrics- describe them using senses, sort them/group together based on similarities/differences. Y2s assess suitability for different purposes, e.g. wool, cotton, synthetic fabric for clothing/soft toys/carpets etc.	Y1: **object** **material** **wood** **plastic** **glass** **metal** **waterproof** **transparent** Y2: **suitable** **properties** **flexible** **rigid** **opaque** **squash** **bend** **twist** **stretch**	*The Three Little Pigs* *Izzy Gizmo* *Rosie Revere, Engineer* *The Great Paper Caper* *Once Upon a Raindrop* *Iggy Peck, Architect* *A Planet Full of Plastic*

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			Linked scientist: Charles Macintosh, developed waterproof fabric			Explore different kinds of plastic – 'A Planet Full of Plastic' could be a good text to explore – find out how plastic is made, plastic pollution (OPTIONAL) Practical investigations – focus on different properties and investigate them in different ways, e.g. Y1s carry out floating/sinking whilst Y2s investigate which material is most suitable for a waterproof coat for a teddy bear. Test the strength of materials – e.g. how many cubes can paper/card hold? Stack up pieces of paper or card to make a bridge and place cubes on – how many until it falls? Y2 record in a table, Y1s work in small groups. Strength of materials – investigate how to build a strong house/bridge using different materials – lego/paper/cardboard/felt/foil, sticks, straw etc, could link to Three Little Pigs fairytale. Y2s record results formally, writing conclusion for which material is the best and why, using properties language. Design a house – give a selection of materials which could be used: glass, wood, stone, rock, brick, plastic, metal, rubber and ask chn to draw their house, labelling which materials they would use for each part. Y1s provide materials labels and template if required; Y2s design own house and label materials used, with simple sentence to explain why they've chosen this using properties.		

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	Summer	Plants/growth and seasonal changes studied in Reception/Y1 Key Qs:	**Plants** NC objectives: **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** **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** Y1: **I know the names of a variety of common wild and garden plants.** **I know that trees can be deciduous or evergreen** and that deciduous trees lose their leaves seasonally, while evergreen trees keep their leaves throughout the year. **I know the basic parts of flowering plants and trees**, including roots, stems, trunks, branches, leaves and flowers. Y2: **I know that seeds and bulbs can grow into mature plants.** **I know that plants grow and change over time** as they develop from seeds or bulbs into mature plants. **I know that plants need water, light and a suitable temperature** to grow and stay healthy. Linked scientist: George Washington Carver	Y1 I can observe closely and identify a variety of common wild and garden plants, including deciduous and evergreen trees. I can identify, describe and classify plants and trees by comparing their basic structures and features. I can ask simple questions about plants and use my observations to suggest answers.	Y2 I can ask questions and observe how seeds and bulbs grow into mature plants over time. I can carry out simple comparative tests to investigate how water, light and temperature affect plant growth. I can gather and record observations and results to describe how plants grow and explain what they need to stay healthy.	USE EXPLORIFY FOR STARTERS – DISCUSSIONS, ODD ONES OUT Explore seeds/bulbs – use magnifying glasses to observe closely and describe what they see. Try and predict what flower/plant you think they might grow into. Plant sunflower/bean seeds to put on window/in pots – label pots. Y2s choose a seed/bulb and draw it, writing questions around the side, e.g. what will happen to the seed? How does it start to grow? Where do the roots come from? Begin a plant diary to observe growth – Y2s to complete drawing, sentence for what they can see and ruler measurements for the height of the plant – ongoing. Complete simple life cycle of flowering plant – Y2s key vocabulary germination – explanation of the processes. Y2s look at differences between seeds/bulbs. Plant a tray of seeds/tray of bulbs to have comparative study between how they grow over time – observational drawings, predictions. Explore plants in the school grounds – plant checklist looking for flowers – how many do you recognise? Chn create observational drawings of the plants they find and label with the correct names – begin to discuss the parts of the flowers they can see. Y1s attach labels to parts of plant, Y2s describe what function the parts of the plants have. Cress investigations – Y1s make cress heads – explore cress seeds, plant seeds, observe over next few days and discuss changes. Y2s set up investigation for what plants need – set up cress without light/water to compare and describe differences. Y1s design a garden habitat for plants – look at flowering plants, fruits/vegetables – recall names, Y2s whether they grow from seeds/bulbs etc. Y2s look at different conditions in which plants can survive – sort plants into different habitats, describe conditions and how they survive/adapt.	Y1 **wild** **garden** **deciduous** **evergreen** **roots** **stem** **leaves** **flower** Y2 **seed** **bulb** **germination** **seedling** **mature** **growth** **temperature** **conditions**	*Jack and the Beanstalk* *The Oak Tree* *The Extraordinary Gardener* *The Little Gardener* *Oliver's Vegetables*

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						Explore trees found in school grounds – deciduous/evergreen – collect leaves/needles from trees, complete plant spotter to identify them by their leaves. Y1 chn complete storyboard of deciduous tree through the seasons (Developing Experts). Label tree with key parts including trunk etc. Y2s gather/observe seeds on trees, complete life cycle of tree/flowering plant – look at similarities/differences.		

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		Animals including humans (human focus) covered autumn term Animals (pets etc) covered in Reception	**Animals including humans (animal focus)** NC objectives: **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)** **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)** Y1: **I know that animals can be grouped** into fish, amphibians, reptiles, birds and mammals. **I know that animals can be carnivores, herbivores or omnivores** depending on what they eat. **I know that different animals, including pets, have different body structures** and features that can be described and compared. Y2: **I know that animals, including humans, have offspring** that grow into adults. **I know that animals grow and change** as they develop from young into adults. **I know that all animals, including humans, need water, food and air to survive.** **Linked scientist: David Attenborough, conservationist Jane Goodall**	Y1 I can observe closely and identify a variety of common animals, including fish, amphibians, reptiles, birds and mammals. I can classify and group animals according to their features and what they eat. I can ask simple questions and use my observations to describe and compare the body structures of different animals.	Y2 I can ask questions and observe how animals, including humans, grow and change from offspring into adults. I can use observations and simple secondary sources to investigate and compare what different animals need to survive. I can gather and record information about animal growth and survival, using my findings to answer scientific questions.	Explore a variety of animal images – recall in naming common animals. Group them – what similarities and differences can you see in the animals? What body parts can you see that some animals have in common? Give some categories for chn to sort into (using hoops etc), e.g. fur, tails etc. Y1s match up labels to parts of animals and compare structures, Y2s have animals and their offspring – match up. Note any similarities/differences. Animal classification – recap the body parts/structures and introduce (revise for Y2) the 5 categories: fish, mammals, reptiles, birds and amphibians. Link the structures to the classifications – Y1s sort common animals into classifications by looking at key features linked to structure. Y2s extend by sorting a wider range of animals and include details about offspring – do they lay eggs, give birth to live young etc. Include images of baby animals as well as adult animals in the sorting. Explore the differences between mammals/birds – Y1s compare structure, Y2s compare life cycles. Explore the differences between amphibians/reptiles/fish – Y1s compare structure, Y2s compare life cycles. What do animals need to survive? Discuss the basic needs of animals and what they might eat. Introduce herbivores, carnivores and omnivores (revise for Y2s). Y1s sort animals using Venn diagram and explain what carnivore/herbivore/omnivores eat. Y2s use fact sheets/non-fiction books to research diets for given animals and make notes – does their diet make them carnivore/herbivore/omnivore? Create simple fact file about chosen animal – Y1s choose a pet, Y2s can choose any animal they've researched previously. Y1s include classification, diet, key features. Y2s extend with where they might live, what they need to survive, and life cycle.	**<u>Y1</u>** **mammal** **bird** **fish** **reptile** **amphibian** **carnivore** **herbivore** **omnivore** **<u>Y2</u>** **offspring** **adult** **growth** **develop** **survival** **water** **food** **air**	*Slime? It's Not Mine!* *You're Called What?* *The Big Book of Beasts* *One Day on our Blue Planet*

Science Curriculum Map

LKS2	Autumn	Last taught Y2 POS – importance of diet, nutrition and exercise for humans. Basic survival needs for animals including humans. Key Qs: What do animals, including humans, need to survive? What can we eat to stay healthy? Why is it important to eat foods from different food groups? Can you remember any of the main food groups? What do we mean by the terms 'carnivore', 'omnivore' and 'herbivore'? Can you think of any examples of these?	**Animals including humans (Y3 POS)** NC objectives: **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** I know that animals, including humans, need the right types and amounts of nutrition to stay healthy. I know that animals cannot make their own food and must get nutrition from what they eat. I know that different foods give our bodies different things we need, like energy, strength, and help to grow. Linked scientist: James Lind – made discoveries over the benefits of fruit in nutrition	Skills Y3 I can ask my own questions about what animals need to stay healthy and decide, with support from teacher, which can be investigated. I can make careful observations and record information using simple tables, drawings or labelled diagrams when exploring different types of food and nutrition. With support, I can set up simple comparative tests to explore patterns, such as comparing the nutritional content of different foods.	Skills Y4 I can generate questions that can be answered using data and choose appropriate ways to investigate nutrition and food groups (with guidance) I can gather, organise and present data (tables, bar charts, written conclusions) to explain what I have found out about nutrition (guidelines given for presenting data) I can plan and carry out fair tests (with scaffolded support from the teacher), controlling variables to explore patterns in nutrition (e.g., energy content, food types).	USE EXPLORIFY FOR STARTERS – DISCUSSION POINTS/RETRIEVAL Making or finding food KS2 | Y3 Science | Lesson Resources | Oak National Academy Making/finding food – OAK lesson. Discuss how animals including humans have to find food, whereas plants can make their own food. Explore the 5 food groups (DEVELOPING EXPERTS + OAK) and explain the function of each food type. Create healthy plates to look at the amount of each food group humans should eat. Nutrition – look at the nutritional content of food labels, and sort using 'traffic lights' based on sugar content – look for patterns in the food types and nutritional values. Pupils could record their findings of 2 or 3 different products using a simple table or bar chart, e.g. comparing sugar content of 3 food types. Sustainable sources of food (non-statutory Climate Change & Sustainability) KS2 | Y3 Science | Lesson Resources | Oak National Academy Look at the sourcing of food (link to local area – farming) and create a poster for making sustainable choices (OAK lesson)	**nutrition** **energy** **protein** **carbohydrates** **vitamins** **minerals** (+ words introduced in weekly lessons – DE)	*Usborne lift-the-flap books – human body, living things, animals* *Non-fiction texts about animals (accessible reads)*

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		Last covered in Y2 POS – habitats and micro-habitats, living/non-living things, grouping animals based on 5 classifications What animal classifications can you remember? What can you tell me about mammals? How are mammals similar/different to reptiles? What is a habitat? Can you name one? What does a living thing need in its habitat? Can you think of some micro-habitats you could find in our school grounds? (Could look outside for this question)	**Living things and their habitats (Y4 POS)** NC objectives **-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.** I know that living things can be grouped in different ways based on their similarities and differences. I know that scientists use classification keys to help group, identify and name living things. I know that living things in my local environment can be sorted into groups using observable features. I know how to use a simple classification key to identify and name living things. I know that classification keys ask yes/no questions to help narrow down which living thing something is. I know that environments can change naturally or because of humans, and that these changes can sometimes be dangerous for living things. Linked scientist: Carl Linnaeus – created system for naming and grouping living things	Skills Y3 I can ask questions about how living things are similar or different and decide which questions can be answered by sorting or grouping. I can observe living things carefully and record their features using drawings, labels or simple tables to help me group them. I can use simple classification keys by answering yes/no questions to identify and name living things. I can compare groups of living things and describe simple patterns, such as where they are found or how their features help them survive	Skills Y4 I can ask scientific questions that can be answered using data, such as how environmental changes affect living things in different habitats – e.g. looking at how the seasons affect the numbers of a certain animal found in the local environment I can construct and use more detailed classification keys (using worked examples), choosing appropriate questions to help identify and group living things. I can identify and explain patterns in how living things respond to environmental changes, using evidence to support my conclusions – focus on dangers to animals due to human changes	USE EXPLORIFY FOR STARTERS – DISCUSSION POINTS/RETRIEVAL DEVELOPING EXPERTS Explore different habitats – include local habitats, could look around school grounds/link with geography and look at ponds/rivers/woodland and focus on those habitats. Research a chosen habitat and create a fact file – broaden research by gathering data on the number of different animals that are found there (labelled diagrams of living things in their habitats) Animals in danger (Climate Change & Sustainability) KS2 | Y4 Science | Lesson Resources | Oak National Academy OAK lesson – look at dangers facing animals in their habitats due to human actions. Could also look at how the seasons affect animal life – what happens to the animal population in winter etc. DEVELOPING EXPERTS Animal classification – explore how they can be classified, look at similarities and differences and decide how to group animals (could group by habitat as starting point to link to prior learning) Create own classification keys (scaffolded for Y3 – answer yes/no questions before creating own) Adaptations to habitats- compare groups of animals based on how they have adapted to their habitats – what helps them survive in their habitat? Draw and label diagrams of animal/plant adaptation. Link back to previous lesson about dangers in habitats – how could human factors affect their survival?	**classification** **characteristics** **habitat** **environment** **adaptation** **classification key** + additional vocab introduced in DE lessons	*Green Planet series* *David Attenborough books on habitat* *Chris Packham – animal journeys*

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	Spring	Prior learning about senses (sight), light/dark – sunlight hours in seasonal changes, sun safety KS1. Key Qs: What are the five senses? Which body part do we use to see? How does daylight change through the seasons? What is the difference between day and night? When can you see your shadow clearly outside?	**Light (Y3 POS)** NC objective: **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.** I know that we need light to see things and that darkness is the absence of light. I know that light travels from a light source and can be reflected off surfaces into our eyes. I know that the Sun is a natural source of light and that looking directly at it can damage our eyes. I know that we can protect our eyes from sunlight by wearing suitable sunglasses and never looking directly at the Sun. I know that shadows are formed when an opaque object blocks light from a light source. I know that the size of a shadow changes depending on the distance between the light source and the object. Linked scientist: Sir Isaac Newton – investigated light sources and properties of light	Y3 skills I can ask questions and carry out simple investigations to explore how we see objects and how light reflects off different surfaces. I can make careful observations to investigate how shadows are formed when light is blocked by opaque objects. I can measure and record how the size of a shadow changes when the distance between an object and a light source changes. I can use my observations and results to describe how shadows change and draw simple conclusions.	Y4 skills I can plan and carry out comparative investigations to explore how effectively different surfaces reflect light, identifying what needs to stay the same. I can investigate how different materials affect the formation of shadows, identifying similarities and differences between opaque, translucent and transparent materials. I can take accurate measurements of shadow sizes at different distances, recording results systematically in tables and bar charts to identify patterns. I can use scientific evidence to explain patterns in shadow size, make predictions, suggest improvements to investigations and raise further questions.	USE EXPLORIFY FOR STARTERS – DISCUSSION AND RETRIEVAL Light and seeing KS2 | Y3 Science | Lesson Resources | Oak National Academy – Lesson 1 to introduce light sources to see. Explore light sources and non-light sources (DE) – sort between two headings. Explore artificial and natural light sources. Sun safety – explore light that comes from the sun and discuss ways that we can protect ourselves. Reflective materials – carry out investigations to explore how different surfaces reflect light – complete using table to record results. Consider reflective material for road safety at night – contextual safeguarding. Opaque, transparent and translucent KS2 | Y3 Science | Lesson Resources | Oak National Academy – introduce these when discussing how shadows are formed. Introduction to light and shadows KS2 | Y3 Science | Lesson Resources | Oak National Academy (useful resource for planning investigation into shadows – breaks down the process of investigating across 2-3 lessons). Investigate how shadows change throughout the day and how the size of shadows can be changed – create puppet show.	Light source Darkness Reflection Reflective Shadow Opaque Transparent Translucent	*The King Who Banned the Dark* *The Dark*

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		Prior learning on senses KS1, 'pitch/volume' vocab encountered in music lessons KS1. Key Qs: What are the five senses? Which body part do we use to hear sounds? Can you hear any loud sounds? Can you hear quiet sounds? What does 'pitch' mean?	**<u>Sound (Y4 POS)</u>** NC objective: **identify how sounds are made, associating some of them with something vibrating** **recognise that vibrations from sounds travel through a medium to the ear** **find patterns between the pitch of a sound and features of the object that produced it** **find patterns between the volume of a sound and the strength of the vibrations that produced it** **recognise that sounds get fainter as the distance from the sound source increases.** I know that sounds are made when objects vibrate. I know that sound vibrations travel through a medium, such as a solid, liquid or gas, to reach our ears. I know that pitch describes how high or low a sound is and depends on how quickly an object vibrates. I know that the size, length and tension of a vibrating object can affect the pitch of the sound it produces. I know that louder sounds are produced by stronger vibrations, while quieter sounds are produced by weaker vibrations. I know that sounds become fainter as the distance from the sound source increases. Linked scientist: Alexander Graham Bell – credited with inventing first practical telephone.	Y3 skills I can ask questions and carry out simple investigations to explore how sounds are made by vibrations. I can make careful observations and identify similarities and differences in the sounds produced by different objects and materials. I can carry out simple comparative tests to explore how changing the length or size of a vibrating object affects its pitch. I can record my observations and use the results to draw simple conclusions about how sounds change as I move further away from the sound source.	Y4 skills I can plan and carry out comparative and fair tests to investigate how the pitch of a sound changes when features of a vibrating object are altered. I can make systematic observations and use appropriate equipment to investigate how the strength of vibrations affects the volume of a sound. I can measure and record how sound levels change at different distances from a sound source, presenting my findings in tables and bar charts. I can identify patterns in my results and use scientific evidence to explain relationships between vibrations, pitch, volume and distance, making predictions and suggesting improvements to my investigations.	USE EXPLORIFY FOR STARTERS- DISCUSSION AND RETRIEVAL DEVELOPING EXPERTS Explore how sounds are made – how vibrations travel through a medium to the ear. Rotation of activities: balloon vibration, rice on clingfilm near speaker, rocks underwater and string attached to hanger. Carry out an investigation to find the most suitable material to create a pair of ear defenders. Could use sound meter on iPad to record decibels heard through each material. Explore volume: Introduction to sound KS2 | Y4 Science | Lesson Resources | Oak National Academy (useful resource for planning investigation around distance from sound source and how this affects volume– over 2 lessons) Explore pitch - Changing the pitch of sounds KS2 | Y4 Science | Lesson Resources | Oak National Academy and use sound meter app to measure – look at length/size of vibrating object and the impact on pitch. (DE) Explore pitch further by creating instruments – explore the materials first and consider how you can change the pitch, e.g. choice of elastic bands over container, how tight they are etc. Challenge – to create an instrument which changes pitch.	Vibration Sound source Pitch Volume Medium Sound wave Distance Frequency	*Step into Science: Sound* *Horrible Science*

Science Curriculum Map

	Summer	Prior learning – plants in KS1. Conditions to grow, naming common flowers, deciduous/evergreen trees, observing how seeds and bulbs grow over time Key Qs What conditions does a plant need to grow and stay healthy? Where do plants come from? What happens when you plant a seed? What is the difference between a seed and a bulb?	**<u>Plants</u>** (Y3 POS) NC objectives: **identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers** **explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant** **investigate the way in which water is transported within plants** **explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.** I know that roots absorb water and nutrients from the soil and anchor the plant in place. I know that the stem or trunk supports the plant and transports water and nutrients to different parts of the plant. I know that leaves absorb sunlight and use light, water and carbon dioxide to make food for the plant through photosynthesis. I know that plants need air, light, water, nutrients and space to grow, but different plants may need different amounts of each. I know that flowers play an important role in reproduction, including pollination and the formation of seeds. I know that seeds can be dispersed by wind, water, animals or explosive mechanisms, allowing new plants to grow in different places.	Y3 skills I can ask relevant questions and carry out simple investigations to explore what plants need to grow and stay healthy. I can make careful observations to investigate how water is transported through a plant, recording my findings using labelled diagrams. I can observe and compare the different parts of flowering plants, identifying their functions and recording similarities and differences. I can gather and record observations of seed dispersal, using my findings to draw simple conclusions about how seeds are spread.	Y4 skills I can plan and carry out comparative and fair tests to investigate how different conditions affect plant growth, identifying variables that need to be controlled. I can make systematic observations and take accurate measurements of plant growth over time, recording and presenting results in tables and bar charts. I can investigate and classify different methods of pollination and seed dispersal, identifying patterns and explaining how these support plant reproduction. I can use scientific evidence from investigations into plant growth and water transportation to draw conclusions, make predictions, suggest improvements and raise further questions.	USE EXPLORIFY FOR STARTERS – DISCUSSION AND RETRIEVAL Plant a range of seeds to begin with – start plant diary with diagrams to add to over time – observe how plants grow over time (Y4s begin recording height of plant using line graph – to be added to over course of the unit) DE Investigate what plants need to grow and stay healthy – plan enquiries based on changing one variable, e.g, fertiliser, no soil/nutrients, more than 1 plant in the pot. Ensure fair testing – Y4s explain why variables need to be controlled, e.g. watering. Explore parts of flowering plants and learn about their functions – write simple explanations on a labelled diagram (although photosynthesis is introduced, they don't need an in-depth explanation of how this works, just what the process needs and that it makes food) Investigate how water is transported through a plant – could set up a carousel of activities, celery, carnations in coloured water – make predictions about what you think will happen for each. Closely observe the cut celery first (magnifying glasses) and use your observations in your prediction. Split some celery at the bottom and put in two different colours – what will happen when they meet? Life cycles of plants – use findings from own planting (beginning of unit) to suggest the cycle a flowering plant goes through. Label each part of the cycle with explanation, including pollination process. Seed dispersal – explore different methods of seed dispersal and significance of its role in plant reproduction (covered in previous lesson). Jigsaw learning – each group learns more information about a type of seed dispersal and adds it to their jigsaw piece to teach the rest of their group. Consider community/school project –	Roots Stem Nutrients Photosynthesis Pollination Fertilisation Seed formation Seed dispersal	*A Seed is Sleepy* *The Big Book of Blooms*

Science Curriculum Map

			Linked scientist: Dr Jane Chory – conducted experiments around plant response to sunlight			planting pollinator-friendly flowers to improve biodiversity of our school grounds.		

Science Curriculum Map

		Prior knowledge of human body – labelling parts of the body. Health and wellbeing – exercise, movement KS1. Structures of animals, vertebrates/invertebrates Key Qs: What benefits does exercise have for your body? Can you name the main parts of your body? Can you name some differences and similarities between certain animals? What is a vertebrate? What is an invertebrate? Name some animals that are vertebrates. How are mammals/fish/birds different?	**Animals including humans (Y3 POS)** NC objectives: **identify that humans and some other animals have skeletons and muscles for support, protection and movement.** I know that humans and many other animals have skeletons that provide support, give their bodies shape and help them stand upright. I know that the skeleton protects important organs, including the skull protecting the brain and the rib cage protecting the heart and lungs. I know that the human skeleton is made up of many bones, including the skull, spine, ribs, pelvis and limb bones, which have different functions. I know that joints are places where bones meet, allowing different parts of the body to move, such as the elbows, knees and shoulders. I know that muscles are attached to bones by tendons and work by contracting and relaxing to produce movement. I know that muscles often work in pairs because they can pull but cannot push, such as the biceps and triceps moving the arm. Linked scientist – Dr Hugh Herr – investigates human movement and creates prosthetic limbs	Y3 skills I can ask relevant questions about how skeletons support, protect and help animals move, using observations to explore my ideas. I can observe and compare skeletons of different animals, identifying similarities and differences and grouping them according to their features. I can carry out simple practical investigations to explore how joints and muscles enable movement, recording my observations using labelled diagrams. I can use evidence from observations and simple investigations to draw conclusions about the functions of bones, joints and muscles.	Y4 skills I can independently plan and carry out comparative investigations into how muscles allow movement, identifying what I will observe and record. I can make systematic observations and take accurate measurements of body movements, recording and presenting findings in tables and charts. I can classify and compare animal skeletons using scientific criteria, identifying patterns and explaining how skeletal structures relate to support, protection and movement. I can use scientific evidence from investigations and secondary sources to explain how muscles work in pairs, draw conclusions and suggest further questions for investigation.	Useful resource for conducting investigations around bones/muscles Introduction to the human skeleton and muscles KS2 | Y3 Science | Lesson Resources | Oak National Academy DE Explore a range of different skeletons, carrying out research on animals (including humans) to find out what kind of skeleton they have. Could group animals into the three kinds of skeletons covered. Explore human skeleton and its three main functions: support, protect, movement – create own skeleton with labels. Begin to identify functions of some bones. Bone length investigation – Oak National Academy resource listed above. Explore different animal skeletons – compare and group animals based on their skeletons – what are the functions of different parts of their skeletons? Compare and group invertebrates as well. Introduction to muscles and explore how they work together in pairs to create a movement – create model of bicep/tricep moving an arm. Plan simple investigation into muscle strength (Oak National Academy resource).	Skeleton Bones Muscles Joints Tendons Vertebrate Contract Relax	*Horrible Science* *The Skeleton Book* *Funny Bones*

Science Curriculum Map

UKS2	Autumn	Human growth last taught in Y2 – know that animals, including humans, have offspring which grow into adults What were you like when you were a baby? What could you do when you were a baby? What stages do humans go through as they grow? What did you learn to do when you were a toddler? What can you do now that you couldn't do when you were a baby? What do you think will continue to change as you grow older?	**Animals including humans (Y5 POS)** NC objective: **describe the changes as humans develop to old age.** I know that humans go through distinct stages of development — infancy, childhood, adolescence, adulthood and old age — and that each stage has characteristic physical, emotional and social changes. I know that as humans develop, their bodies change in complex ways, including growth, puberty, changes in strength and coordination, and later a gradual decline in mobility, senses and muscle mass. I know that ageing affects the body in different ways, and that lifestyle factors such as diet, exercise and environment can influence how healthy people remain as they grow older. Linked scientist: Marie Stopes – work on human development	Skills Y5 I can take accurate measurements (e.g., height, handspan) using standard units and record them clearly in tables or graphs (could do table first then, with support, choose another way to record) I can choose appropriate ways to present data, such as bar charts or line graphs, to show how humans grow and change over time (as part of an enquiry question) I can interpret patterns in data about human growth and explain what the patterns show, using evidence from my charts and tables (or provided charts/tables) I can ask questions that can be answered using data, such as how height changes with age or how lifestyle might affect development.	Skills Y6 I can record and analyse data from charts, graphs and tables (including life-expectancy data) and explain trends, anomalies and possible causes. I can plan investigations into human development, identifying variables (e.g., age, height, handspan) and evaluating how reliable my data is. I can communicate conclusions clearly, using scientific vocabulary to explain how lifestyle factors (diet, exercise, environment) may influence health and ageing. I can use evidence from data to support explanations about human development – reference the data in the explanation (sentence stems and models provided)	USE EXPLORIFY FOR STARTERS – DISCUSSION POINTS/RETRIEVAL OAK useful resources to explore Human development KS2 | Y5 Science | Lesson Resources | Oak National Academy DEVELOPING EXPERTS Identify key elements of a mammal's life cycle – complete own cycle with explanations for the stages (life-cycle wheel) Look at gestation periods – compare with human gestation period OAK +DE resources together: Look at key changes at each stage of development – design tests around these, e.g. hand spans of different aged children, heights of different people through the stages of development Learn about changes experienced in puberty and old age Life expectancy (non-statutory Climate Change & Sustainability) KS2 | Y5 Science | Lesson Resources | Oak National Academy Could look at lifestyle factors to see how it affects life expectancy.	**development** **adolescence** **puberty** **maturity** **ageing** **life expectancy** + vocab developed in each lesson	*The Arrival (English)* *The Red Tree*

Science Curriculum Map

		Links to previous study: rocks in Y3 POS, animal/human growth Y2/Y5, habitats/adaptations Y4 What do you know about fossils? How are they formed? How do animals and humans change over time? How do animals evolve to adapt to their environment? Can you think of a way that an animal has adapted to its habitat?	**Evolution and inheritance (Y6 POS)** NC objectives: **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.** I know that living things have changed over millions of years, and that fossils give us important evidence about organisms that lived long ago. I know that living things produce offspring of the same kind, but that offspring normally vary and are not identical to their parents because of inherited characteristics. I know that animals and plants have adaptations that help them survive in their environments, and that over long periods of time these adaptations can lead to evolution. Linked scientist: Charles Darwin (evolution) Mary Anning (fossils)	**Skills Y5** I can plan scientific enquiries to answer questions about how living things have changed over time, including how fossils provide evidence of past life. I can record observations of fossils and living things using diagrams, labels and tables to show similarities, differences and possible evolutionary links. I can identify patterns in how animals and plants are adapted to their environments and use these patterns to suggest how species may have changed over time (compare adaptation of plants and animals) I can use scientific evidence (such as fossil features or observable adaptations) to support or challenge ideas about how living things have evolved.	**Skills Y6** I can interpret scientific evidence — including fossil records, diagrams and historical data — to explain how species have changed and adapted over millions of years. I can evaluate how reliable different sources of evidence are when investigating evolution, recognising that some fossil evidence is incomplete or open to interpretation. I can explain causal relationships between environmental pressures and adaptations, using evidence to show how these changes may lead to evolution. I can identify scientific evidence that supports or refutes ideas about inheritance, variation and evolution, and explain how scientists use this evidence to develop theories.	USE EXPLORIFY FOR STARTERS – DISCUSSION POINTS/RETRIEVAL **Evolution and inheritance KS2 | Y6 Science | Lesson Resources | Oak National Academy** DEVELOPING EXPERTS Look at similarities/differences between parent/offspring – inherited characteristics and variation between same species (look at cross-bred dogs and inherited characteristics) Inherited characteristics KS2 | Y6 Science | Lesson Resources | Oak National Academy Explore differences between inherited characteristics and environmental characteristics Animal adaptations – choose animal to research and create diagram of adaptations over time. Linked lesson Charles Darwin and finches KS2 | Y6 Science | Lesson Resources | Oak National Academy Plant adaptations – could do a leaf study to show how trees have adapted to their environments. The survival of the fittest KS2 | Y6 Science | Lesson Resources | Oak National Academy Fossil exploration – what can we learn about living things based on the fossils of extinct creatures?	**variation** **inherited** **adaptation** **ancestor** **Homo sapiens** **natural selection** **evolved** **extinct**	*Moth* *Darwin non-fiction texts*

Science Curriculum Map

	Spring	Previously studied in Y3 – reflections, shadows Key Qs:	**Light (Y6 POS)** **NC objectives** **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** I know that light travels in straight lines. I know that we see objects when light travels directly from a light source into our eyes or reflects off an object into our eyes. I know that shadows form when an object blocks light, and because light travels in straight lines, shadows have the same shape as the object casting them. Linked scientists:	**Y5 skills** I can plan a simple scientific enquiry to investigate how light travels and how shadows are formed. I can use scientific equipment to measure the size of shadows accurately and record my results in tables and diagrams. I can identify variables to keep the same when investigating how the position of a light source affects a shadow. I can use my observations and results to explain how shadows are formed and make predictions about what might happen next.	**Y6 skills** I can plan and carry out a fair test to investigate how changing the position or distance of a light source affects the size of a shadow, controlling variables. I can take accurate measurements, repeat readings where appropriate and present my results using tables and graphs. I can use scientific evidence to explain how light travels in straight lines, how we see objects and why shadows form. I can draw conclusions from my results, explain cause-and-effect relationships and evaluate how reliable my findings are.	USE EXPLORIFY FOR STARTERS – DISCUSSION POINTS Developing Experts Explore how light travels – set up an investigation to show that light will not bend round a tube. Useful resource to show how we see: Light enters our eyes KS2 | Y6 Science | Lesson Resources | Oak National Academy Explore reflection – carry out a fair test to investigate how well light is reflected off surfaces. Consider previous learning about how we see things – create a periscope to show how we see things reflected. The position of shadows (non-statutory) KS2 | Y6 Science | Lesson Resources | Oak National Academy – useful resource to predict how the position of a light source will affect the size of a shadow. Re-introduce how shadows are created and make predictions. Chn complete investigation into sizes of shadow – record using line graph (Y6) and tables/diagrams (Y5) Explore the shapes of shadows and why they are cast in the same shape of the object – extend for Y6 into drawing conclusions from prior learning, cause/effect linking to light travelling in straight lines.	Light Light source Reflection Shadow Opaque Transparent Light ray Variable	
	Summer							

Science Curriculum Map

Contextual safeguarding:	SEND adaptations:	Enrichment opportunities:
KS1 – safety throughout the seasons, e.g. sun safety, water safety in hot weather -food prep safety, handwashing -local walks – risk assessments, hazards of local area LKS2 -respect for living things in habitats, safe exploration of school grounds -online safety when conducting research -safe use of equipment, e.g. torches, volume of sounds -sun safety, particularly eye protection UKS2 -consideration of emotional needs (families, life expectancy conversations) -online safety -puberty/body discussions – handled sensitively and with appropriate vocabulary -safe use of equipment	Visual prompts and guides Dual coding – widgits for vocabulary Pre-teach core vocabulary Scaffolded tables/charts to record (could be partially completed) Writing frames to scaffold investigations Practical activities (sorting, classifying etc) Chunked instructions – small steps throughout lessons Large-scale diagrams with word banks Alternate recording methods, e.g. cut/stick images, completing sentence stems	Local walks – exploration of school grounds/local habitats Opportunities for cooking (cross-curricular link, healthy snack boxes DT KS1) Sports events linked to fitness, e.g. Skip2bFit Visit from beekeeper to talk about microhabitats (KS2) – could discuss population of bees etc