

## Science curriculum

<b>Intent</b>	At Lord Street we want our children to think like scientists by developing enquiring minds and analytical thinking skills. Science continues to evolve and new findings about the world in which we live are constantly being discovered. We want our children to be able to engage with our ever changing world by providing a curriculum that covers the three scientific disciplines of biology, physics and chemistry.		
<b>EYFS</b>			
<ul style="list-style-type: none"> <li>Explore the natural world around them, making observations and drawing pictures of animals and plants.</li> <li>Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</li> <li>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter</li> </ul>			
<b>Disciplinary Knowledge</b> ( Working Scientifically)	<b>Planning and Predicting</b> Ask teachers or adults within school about the things they observe Ask questions about world around them.	<b>Investigating and Observing</b> Make observations about the things they see around them Make simple comparisons between object or living things Conduct guided investigations through play	<b>Recording, analysing and evaluating</b> Explore the world around me making observations and drawing pictures of plants and animals Make suggestions about how things work based on my observations Use basic observations to help answer questions with help from the teacher
<b>Disciplinary Knowledge</b> (Second order skills)	<b>Similarity and Difference:</b> I can identify simple similarities and differences <b>Written and Oral Expression:</b> I can engage in discussion <b>Cause and Consequence:</b> I can observe processes <b>Continuity and Change:</b> I can observe what changes and what stays the same		
<b>Year 1</b>			
<b>Disciplinary Knowledge</b> ( Working Scientifically)	<b>Planning and Predicting</b> Ask questions about world around them that can be answered in different ways Suggest what might happen and how to test ideas	<b>Investigating and Observing</b> Make observations using appropriate senses Observe closely using simple equipment ( e.g. hand lenses, egg timers) Use non-standard measures Make simple comparisons and groupings Perform simple test to investigate the answer to a given question	<b>Recording, analysing and evaluating</b> Communicate findings in simple ways- pictorial and 1 or two sentences. Make oral contributions which can add to group or class discussion Collect evidence to try to answer a question. Gather and record data/ observations using given tables or sorting charts

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<p><b>Disciplinary Knowledge</b> (Second order skills)</p>	<p><b>Continuity and Change:</b> Observe what changes and what stays the same. Observe what changes and what stays the same with flowering plants. Observe seasonal changes and what stays the same  <b>Similarity and Difference:</b> Make comparisons and note differences.  <b>Cause and Consequence:</b> With support, find patterns and draw simple conclusions  <b>Written and Oral Expression:</b> Describe what they observe in science orally and in simple sentences. Use scientific vocabulary appropriate to year group in  <b>Responsibility:</b> Follow basic rules to keep safe whilst working</p>						
<p>KEY Concept Vocabulary</p>	<p>Change Describe Properties</p>			<p>KEY Topic Vocabulary</p>	<p>Roots ,stem ,leaves, materials, seasons, weather ,human Senses, carnivore, herbivore, force, push, pull Names of body parts</p>		
<p>Term</p>	<p>Autumn 1</p>	<p>Autumn 2</p>	<p>Spring 1</p>		<p>Spring 2</p>	<p>Summer 1</p>	<p>Summer 2</p>
<p>Year 1 ( NC)</p>	<p><b>Seasonal changes</b> Observe changes across the seasons, including weather and variation in day length  <b>Plants</b> Identify and name common wild and garden plants, including deciduous and evergreen trees; describe the basic structure of trees</p>	<p><b>Everyday materials</b> Distinguish between an object and its material; identify and name everyday materials; describe simple properties of materials and group objects according to these</p>	<p><b>Animals, including humans</b> Identify and name a variety of common animals and their structures: fish, amphibians, reptiles, birds and mammals, including pets; identify and name carnivores, herbivores and omnivores</p>		<p><b>Seasonal changes</b> Observe changes across the seasons, including weather and variation in day length * Plants Identify and name common wild and garden plants, including deciduous and evergreen trees ( as part of seasonal walk)  *Forces Notice and describe how things move. Noticing fast and slower.  *Sound Observe and name a variety of sources of sound.</p>	<p><b>Animals, including humans</b> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p><b>Seasonal changes</b> Observe changes across the seasons, including weather and variation in day length <b>Plants</b> Identify and name common wild and garden plants, including deciduous and evergreen trees; describe the basic structure of a variety of common flowering plants</p>

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Key Question	Is a tree a plant? What are plants like in Autumn?	What is our school made of? How can we sort these materials?	Is a human an animal? What kind of animal is a human?	What changes can we see in Spring? How do we make things move?	What are my 5 senses? How far can my eyes see?	What are plants like in summer? What will happen to my seed?
Substantive Knowledge	<p>The sun is a light source Seasons bring different weathers There are four seasons: spring, summer, autumn and winter</p> <p>Plants have roots, stems, leaves and flowers Deciduous trees lose their leaves Evergreen trees do not lose their leaves Recognise daisies/ daffodils/ oak/ sycamore/ bluebells</p>	<p>An object is something that is man-made or natural   The material is something from which an object is made</p> <p>To recognise wood, glass, plastic and metal as materials</p> <p>Properties describe materials e.g. hard, soft, brittle, bendy ,</p>	<p>Animals are living organisms</p> <p>Animals that have their skeletons inside their body can be classified into mammals, fish, reptiles, amphibians and birds</p> <p>Animals that eat meat are called carnivores</p> <p>Animals that eat only fruit and vegetables are called herbivores</p> <p>Animals that eat both meat, fruit and vegetables are omnivores</p> <p>Mammals give birth to live young Birds, fish, reptiles and amphibians lay eggs</p>	<p>The sun is a light source</p> <p>Seasons bring different weathers</p> <p>There are four seasons: spring, summer, autumn and winter</p> <p>Pushes and pulls are forces</p> <p>Pushes and pulls make things move or change the direction of an object</p> <p>The harder something is pushed or pulled the more it will move</p> <p>Volume is how noisy or quiet a sound is</p>	<p>Know the names of basic body parts.</p> <p>We have 5 senses The senses are touch, smell, sight, hearing, and taste.</p>	<p>Plants have roots, stems, leaves and flowers Deciduous trees lose their leaves Evergreen trees do not lose their leaves Recognise daisies/ daffodils/ oak/ sycamore/ bluebells</p>
Key Learning	<p>* Identify plants and not plants in school grounds. Note key features of all plants identified.</p> <p>Compare plants with trees using these</p>	<p>Link forward - Y2 Everyday Materials * Go into school grounds identify, name and label parts of the external school building</p>	<p>Research using secondary sources (video clips, pictures, teacher knowledge)</p> <p>* Use photos to identify animals and not animals - provide selection of photos,</p>	<p>Link to prior learning from autumn term + link forward to summer term.</p> <p>*</p>	<p>Link to work in spring term (humans as animals/mammals/ omnivores). * Recap what they know about humans.</p>	<p>Link to prior learning from autumn term and spring term. * Ongoing throughout the term - Continue with whole class working display, once a week recording</p>

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<p>features and then use their observations and findings to answer the</p> <p><b>Key Question: Is a tree a plant? (observe closely, compare and contrast, describe groupings, explore and answer questions)</b>          * Name the four seasons. Zoom in to autumn; zoom in to one evergreen tree and one deciduous tree in the school grounds</p> <p>. Label a diagram of a tree: leaves, trunk, branches. <b>Key Question: What are plants like in autumn?</b> (observe closely, compare and contrast, labelled diagrams)</p> <p>Start a whole class working display – record today’s date, weather, temperature and the time it goes dark. Continue throughout year, adding to it every month. Note clocks moving back in October and nights</p>	<p><b>. Key Question: What is our school made of? (observe, name)</b></p> <p>* Vocab: MATERIAL</p> <p>Group everyday objects made from wood, metal, plastic. Record using table/photos – sort photos against correct material (identifying, grouping, classifying)</p> <p>* Recap meaning of ‘material’. Classify materials based on their properties: wood, metal, plastic, fabric, glass, rock. Key <b>Question: How can we sort these materials?</b> (binary answers: e.g. hard/soft, rough/smooth, bendy/not bendy)</p> <p>Record using stem sentences and properties of materials:          e.g. Wood is _____ and _____ (identifying, grouping, classifying)</p> <p>* Investigation: (comparative test) – Planning: Which is the best material for an umbrella? Which material makes the best moppper upper? ( comparative test) –</p>	<p>including birds, fish, amphibians, reptiles and mammals (including human), with some examples of familiar pets and farm animals, as well as examples of plants, rocks and elements (water, fire etc.)</p> <p>Children to explain how they know if the photo shows an animal and use this to answer the Key Question: <b>Is a human an animal?</b> (use observations to explore and answer questions)</p> <p>* Zoom in to animals: identify and sort pictures into groups using key features: fish, birds, mammals, including a human.</p> <p>How do you know this is a fish? How do you know this is a bird? etc. Use process of elimination to answer the Key Question: <b>What kind of animal is a human?</b> (identifying, grouping, classifying, use observations to compare and contrast, explore and answer questions)</p> <p>* Zoom in to animals: identify and sort pictures of amphibians and reptiles using key features as</p>	<p><b>Key question: What changes can we see in Spring?</b>          Ongoing throughout the term - Continue with whole class working display, once a week recording date, weather, temperature and the time it goes dark. Note clocks moving forward at the end of March and days getting longer. Record today’s data in books (observe and talk about changes, make tables/ charts/displays)          * Recap the four seasons.</p> <p><u>Forces</u></p> <p><b>Key Question: How do we make things move?</b>          Identify pushes and pulls in play – i.e. with toys and playground equipment</p> <p>Can we make pushes and pull with our bodies – link to PE</p> <p>Sort forces according to whether it is a push or a pull. ( identifying and classifying )-using sorting hoops</p>	<p>Name and label external parts of their body: neck, shoulders, chest elbow, hands, fingers knees, feet, toes</p> <p>* Compare body parts of a human with those of a cat using double bubble graphic organiser. What is the same? What is different? (observe closely, compare and contrast, explore and answer questions)</p> <p>* Vocab: SENSES</p> <p><b>Key question: What are my 5 senses?</b>          Identify and name the five senses. Zoom in on sound, smell, and taste – children to experience selection of each. Record by showing preferences (draw or write). (compare and contrast)</p> <p>* Recap on five senses. Zoom in on touch and sight. - Use feely bags to explore textures. –</p> <p>Complete sight</p>	<p>date, weather, temperature and the time it goes dark.          Note longest day on June 21st.</p> <p>Record today’s data in books. (observe and talk about changes, make tables/ charts/displays)</p> <p>* Recap the four seasons and complete the whole class working display.          Zoom in to summer. Identify and name flowering plants in the school grounds. Key Question: <b>What are plants like in summer?</b> (observe closely, compare and contrast, draw diagrams)</p> <p>* Zoom in to look at plant structure. Label: flowers/blossom, petals, stem, leaves, roots, fruit (identify, labelled diagrams)</p> <p>* Plant a sunflower seed. <b>Key Question: What will happen to the seed?</b> (explore and answer simple questions)</p>
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	<p>drawing in. Record today's data in books (observe and talk about changes, make tables/charts/displays)</p>	<p>Results (what happened) – Conclusion Answering the question – how do you know?) (raise and answer questions, perform simple tests to explore and answer questions)</p>	<p>before – frog, toad, newt, snake, lizard, turtle, and crocodile. (identifying, grouping, classifying, use observations to compare and contrast)</p> <p>* Animals need food to survive – they either eat plants, or animals, or both. Classify and sort animals into herbivore, carnivore, and omnivore. Key Question: <b>Humans - herbivore, carnivore or omnivore?</b> (identifying, grouping, classifying)</p>	<p>Go on a force hunt around school/classroom label pushes and pulls.</p> <p>Comparative test : How can I make my car move faster/further?</p> <p><u>Sound</u></p> <p>Go on a listening walk around school what sounds can you hear. "Sound Quiz" can we identify what has made the sound.</p> <p>Investigate different ways to make sounds and change the volume of the sound?</p>	<p>Investigation: (pattern seeking) - How far can my eyes see? Use similar pics/measure distances. Share data to draw an overall class conclusion on sight/distance. –</p> <p>Further discussion – Which do you think is the most important sense? Why? (compare and contrast, use observations to ask and answer questions</p>	<p>* Return to the two trees and record changes. (observe closely, compare and contrast, keep records of changes over time)</p> <p>Link forward – Y2 What plants need to grow * Observe and record changes to sunflower seed. <b>Key Question: What has happened to the seed?</b> (use observations to answer questions)</p>
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### Year 2

<p><b>Disciplinary Knowledge</b> ( Working Scientifically)</p>	<p><b>Planning and Predicting</b></p> <p>With help, raise some ideas and questions to investigate. Raise questions based on what they have observed</p> <p>Think about how to collect evidence</p> <p>Suggest what might happen</p> <p>Think about and discuss whether comparison is fair or unfair</p>	<p><b>Investigating and Observing</b></p> <p>Make observations and comparisons using simple equipment following simple instructions.</p> <p>Use first-hand experience and, with help, simple information sources to answer questions</p> <p>Research the answers to questions using books, computers or tablets</p> <p>Use rulers/tape measures to take measurements in cm</p>	<p><b>Recording, analysing and evaluating</b></p> <p>Record findings in simple tables, tally charts and graphs (as covered in year 2 maths curriculum)</p> <p>Say what has happened and whether if it was what you expected.</p> <p>Use observation and ideas to answer questions using simple sentences to describe the answer</p> <p>Draw basic conclusions with simple reasoning</p> <p>Record findings using labelled diagrams</p>
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<b>Disciplinary Knowledge</b> ( Second order skills)	<b>Similarity and Difference:</b> Make comparisons, note differences and draw conclusions <b>Written and Oral Expression:</b> Draw conclusions and explain processes. Present data in simple tables, tally charts and block graphs /pictograms <b>Responsibility:</b> Understand how to work safely and fairly <b>Continuity and Change:</b> Observe what changes and what stays the same <b>Significance:</b> Identify significant information and explanations about plants					
<b>KEY Concept Vocabulary</b>	Predict Material Movement Sort	<b>KEY Topic Vocabulary</b>	Habitat, Food chain, Germination , Pollination, Growth , Health Nutrition , Deciduous, Evergreen , Names of common materials Wires, bulb, battery.			
<b>TERM</b>	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 2 ( NC link)	<b>Uses of everyday materials</b> Identify and compare the suitability of a variety of everyday materials for particular uses; find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	<b>Plants</b> Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy; observe and describe how seeds and bulbs grow into mature plants.	<b>Plants</b> Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy; observe and describe how seeds and bulbs grow into mature plants.  <b>*Electricity</b> Construct a simple circuit and identify things that run on electricity.	<b>Living things and their habitats</b> Explore and compare the differences between things that are living, no longer alive, and 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; identify and name a variety of plants and animals in their habitats	<b>Living things and their habitats</b> 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.	<b>Animals, including humans</b> Notice that animals, including humans, have offspring which grow into adults; find out about and describe the basic needs of animals, including humans; describe the importance for humans of exercise, eating the right amounts of different foods.
<b>Key Question</b>	<b>Which do you think is the best material for a (plate/cup/spoon)?</b>	<b>What is the effect of changing what you add to a circuit?</b>	<b>What do plants need to grow and stay healthy?</b>	<b>How do we know it is alive?</b>	<b>What microhabitats are there in the school environment?</b>	<b>Do all baby animals look like their parent?</b>

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	<b>How can we change the shape of different materials?</b>	<b>What do plants need to grow and stay healthy?</b>				
Substantive knowledge	<p>Materials and their properties.</p> <p><b>Wood:</b> hard, stiff, strong, opaque can be carved into any shape</p> <p><b>Plastic:</b> waterproof, strong, can be made flexible or stiff, smooth or rough</p> <p><b>Paper:</b> lightweight,, flexible</p> <p><b>Fabric:</b> soft, flexible, hard wearing, can be stretchy, warm and absorbent</p> <p><b>Glass:</b> waterproof, transparent, hard and smooth</p> <p><b>Metal:</b> strong, hard, easy to wash</p> <p><b>Cardboard:</b> strong, light, stiff</p>	<p><b>Electricity</b> Name the parts of a series circuit All the parts need to be connected for a circuit to work Mains electricity is dangerous</p> <p><b>Plants</b> Plants have roots, stems, leaves and flowers Plants need light and water to survive Most plants start their life cycle as a seed but some grow from bulbs</p> <p>Every plant has a different seed</p> <p>Some plants that grow from bulbs are daffodils, snowdrops , tulips, crocuses and lilies</p>	<p>Plants have roots, stems, leaves and flowers Plants need light and water to survive Most plants start their life cycle as a seed but some grow from bulbs</p> <p>Every plant has a different seed</p> <p>Some plants that grow from bulbs are daffodils, snowdrops , tulips, crocuses and lilies</p>	<p>Things can be sorted into living, were once alive and have never been alive</p> <p>Animals need <b>air so that they can breathe, water and food</b> to survive, and shelter so that they're protected from the environment and also from predators.</p> <p>Recognise and identify a spider, lichen, moss, grass, earwig, slug, worm,</p>	<p>Micro habitats differ from the larger environment around them</p> <p>Know some micro habitats around school – e.g. A puddle, a log pile , the space under a stone , the long grass on the field</p> <p>Plants are at the bottom of the food chain</p> <p>Carnivores are at the top of the food chain</p>	<p>All young animals change as they go through the different stages of their life cycle and grow into adults</p> <p>To stay alive, all humans have three basic needs for survival: air, water and food</p> <p>To grow into a healthy adult, we must eat the right types of food in the right amount and exercise</p> <p>Drink 6 – 8 glasses of water a day</p> <p>Eat a balanced diet limiting high sugar and fat foods to treats</p> <p>Washing hands can limit the spread of germs</p>
Key learning	Link to prior learning – Everyday Materials (Y1) * Recap materials and the difference between a	<u>Electricity</u> Identify objects which use electricity around school	Link to prior learning before Christmas . * Initial results of observation over time –	Link to prior learning: plants, seasonal changes	Link to prior learning from previous term + link forward to Y4 Habitats	Link to prior learning: Y1 animal classification, including humans. * Picture sort – match



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<p>material and an object. Examine each material and recap properties and vocabulary</p> <p>Investigation: (pattern seeking) What can you find in our classroom made of wood/metal/plastic? Find examples and collate data using a simple table/tally chart. Use this evidence to make a hypothesis as to which of these three materials is the most common in the classroom. (ask and answer questions)</p> <p>* Selection of same object (e.g. plates or cups or spoons) made from different materials (e.g. paper, plastic, and ceramic).</p> <p>Identify and name the properties of each material . Key Question: <b>Which do you think is the best material for a (plate/cup/spoon)?</b> Why? Record using photos/giving reasons.</p>	<p>Zoom into appliances which use mains electricity, dangers and how to keep safe</p> <p><b>Key question: How do you make a bulb light?</b> Present children with a range of batteries, bulbs and wire- explore how to make bulbs light- represent finding with own diagrams What is the effect of changing what you add to a circuit? (pattern seeking)</p> <p><u>Plants</u> Link to prior learning: Y1 summer term * Recap on parts of a plant. Key Question for this term's work: <b>What do plants need to grow and stay healthy?</b> Take ideas/predictions/ suggestions from children.</p> <p>* Recap on planting sunflowers at end of Y1. Show bean seed. Investigation: (fair test) – Planning Does a plant need water to grow?</p> <p>* Vocab – GERMINATE Investigation: (fair test) - Results (what happened) and</p>	<p>evidence of germination but slower in colder temps (perform simple tests to explore and answer questions)</p> <p>* Investigation: (fair test) – Planning Does a plant need light to germinate? Cress seeds to be planted and left in the light and in the dark.</p> <p>* Investigation (fair test) - Does a plant need light to germinate? Results (what happened) Conclusion (answering the question – how do you know?) Evidence of growth in both light and dark, but plants in the dark are paler and less healthy (sunlight provides food/energy for leafy plants, therefore healthier in the light) (raise and answer questions, perform simple tests to explore and answer questions)</p> <p>* Final results of observation over time (warmth) – further growth of bulb, evidence of bud/flowers when kept in the warm. - Pull together understanding from whole term on conditions for growth from all investigations - overall conclusion for effects of water, light and</p>	<p>* In playground, identify things that are living/not living. Through further discussion, sort pictures of objects that are living, used to be alive, and have never been alive, e.g. wooden bench, cooked chicken (classifying and sorting, raising and answering questions, record using charts)</p> <p>* Link back to last lesson and things that are living. Zoom in on living things – animals and plants. <b>Key Question: How do we know it is alive?</b> Discuss using what they know about conditions for growth/health of plants and what they know about themselves as animals plus pets/knowledge of other living things. Begin to create a list of factors that determine if something is alive (simplified version of MRS GREEN – link forward to Y4) (exploring questions, using observation to answer questions) Link forward – Y4 Habitats</p>	<p><b>Key Question: What microhabitats are there in the school environment?</b> Recap 'habitat' and what living things need to survive. Zoom in on the local habitat of the playground and link back to Y1 work by exploring the school forest and identifying microhabitats within it (e.g. a decomposing log, or one particular tree). Identify and name animals found in any of the school microhabitats and record these (drawing/photos)</p> <p>Back in class, classify any animals found, introducing the term 'invertebrate'. (observe, identify, classify)</p> <p>* Recap on habitat of our school forest and make comparisons with rainforest habitat – What is the same? What is different? (observe, compare and contrast)</p> <p>* Link back to Y1 to recap key vocabulary: herbivore, carnivore, omnivore Use familiar</p>	<p>adult to young: human/baby, frog/tadpole, cat/kitten, butterfly/caterpillar, crocodile/hatchling, shark/pup, and swan/cygnets. <b>Key Question: Do all baby animals look like their parent?</b> (observe, ask and answer questions) * Focus on life cycle of a chicken. <b>Key Question: Is it only birds that lay eggs?</b> Children to further explore ONE of the following life cycles: a moth, a frog or a human. * Recap on what habitats provide for living things and secure understanding of the four basic needs for survival: food, water, air, shelter. Children discuss and record how one example of a mammal, one fish, one bird each get their basic needs met in their relevant habitat. (research using secondary sources)</p> <p>* Zoom into humans. Key Question: What do humans need to</p>
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	<p>Carry out a series comparative tests related to properties - (observe, compare, record observations)</p> <p>* Key Question: <b>How can we change the shape of different materials?</b> Provide children with a range of objects of different materials, including examples of thick and thin, for example thick cardboard box/piece of paper; felt tip pen /freezer bag; pan/piece of foil. Also provide everyday inflexible objects made of wood/stone</p> <p>In groups, children explore how to change the shape of each object/material.</p> <p>Discuss those that they cannot change with their hands – what could be used instead? Discuss how changing the shape of a material offers a wider range of uses. (observe, compare, ask questions, use observations to answer questions)</p>	<p>Conclusion (answering the question – how do you know?)</p> <p><b>Development question: What will happen if I keep watering the one that has germinated?</b> (raise and answer questions, perform simple tests to explore and answer questions)</p> <p>* Continue to observe growth/changes – detailed labelled drawing of bean plant: stem, leaf, roots (closely observe, draw labelled diagrams) Link forward - Y3 Labelling parts of flowering plant</p> <p>* Investigation: (observations over time) – Does a plant need warmth to germinate? plant two bulbs of flowering plants (one indoors, one outdoors); draw/write a prediction for each bulb (perform simple tests to explore and answer questions)</p>	<p>temperature on growth and health of plants. (raise and answer questions, perform simple tests to explore and answer questions)</p>	<p>* Vocab: HABITAT</p> <p>Recap on living things that were found in our playground – establish that the different areas in the playground are called habitats. Establish that a habitat provides a living thing with everything it needs to survive. Whole class activity: match selection of animals and plants to 5 global habitats (Atlantic Ocean, Sahara Desert, Wycoller, Arctic tundra, Buffalo Gap Grassland (USA). Locate these habitats on the world map. (identify, classify, group, describe groupings)</p>	<p>examples, including humans, to build simple food chains (e.g. grass, cow, human or worm, blackbird, cat) referring to herbivores, carnivores and omnivores.</p> <p>Use this activity to secure understanding of how animals obtain their food from plants and other animals, as well as introducing the idea of dependency within habitats for survival</p>	<p>stay healthy? Lesson on food groups and balanced diet</p> <p>. * Zoom into humans. 5-minute workout - identify how it makes them feel. Establish recommended exercise per day. Investigation: (pattern seeking) - Have I had enough exercise today? Support the children to calculate and record their exercise for today. Use this data to draw individual conclusions and answer question. (gather and present data in tables, use data to answer questions)</p> <p>* Vocab: HYGIENE</p> <p>Discuss and record what we need to do to stay clean and healthy (link to PSHE)</p>
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Year 3						
Disciplinary Knowledge ( Working scientifically)	<b>Planning and Predicting</b> Respond to suggestions, with help put forward ideas about testing.  Make predictions  With help, consider what constitutes a fair test With help, plan and carry out a fair test		<b>Investigating and Observing</b> Make observations and comparisons with increased independence  Set up simple practical enquiries, comparative tests and fair tests. Measure length, volume of liquid and time in standard measures using simple equipment.  Use first-hand experience and simple information sources to answer questions		<b>Recording, analysing and evaluating</b> Communicate findings in a variety of ways Say whether what happened was expected  With help, identify simple patterns and suggest explanations  Record findings using simple scientific language, drawings, labelled diagrams , bar charts and tables  Report on findings both orally to the class and in written explanations of results and conclusions  Use results to draw conclusions	
	<b>Disciplinary Knowledge</b> ( Second order skills) <b>Responsibility:</b> Work safely, comparatively and fairly <b>Written and Oral Expression:</b> Present and interpret data and draw conclusions. Share findings of investigations orally and in written form. Use scientific terminology and explain processes <b>Significance:</b> Learn about significant discoveries, theories and scientists <b>Continuity and Change:</b> Observe over time .Observe what changes and what stays the same. Understand what changes and what stays the same <b>Similarity and Difference:</b> Make comparisons by describing similarities and differences. Use comparison to describe patterns and draw conclusions <b>Cause and Consequence:</b> Observe processes and relate these to simple scientific ideas					
KEY Concept Vocabulary	Observe Investigate Sort		KEY Topic Vocabulary	Names of food groups, Balanced diet , Pollination , Flowering, Non –flowering Transportation , Basic names of bones, Magnetic, Repel and attract, , Types of rocks , Fossil , Vibrate, reflect		
TERM	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
NC link	<b>Light</b> 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	<b>Forces and Magnets</b> 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	<b>Rocks and Soils</b>  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.		<b>Flowering plants</b> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers; explore the part that flowers play in the life cycle of	<b>Animals, including humans</b> 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

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	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	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.		flowering plants, including pollination, seed formation and seed dispersal; explore the requirements of plants for life and growth and how they vary from plant to plant; investigate the way in which water is transported within plants.	eat; identify that humans and some other animals have skeletons and muscles for support, protection and movement.
<b>Key Question</b>	<b>Can we see in the dark?</b> <b>What are shadows?</b>	<b>On which surface will the car travel furthest?</b> <b>Which materials are magnetic?</b>	<b>Which rock is the hardest?</b> <b>What is soil?</b>	<b>How does water travel around a plant?</b>	<b>Where can we see muscles on our body?</b> <b>What would happen if humans didn't have a skeleton?</b>
<b>Substantive knowledge</b>	Light comes from the sun and other devices such as torches  Dark is an absence of light we need light to help us see.  When a solid object blocks the light it will create a shadow  Transparent and translucent object allow	A force is a push or a pull  A force will change the motion of an object making it speed up , slow down or stop  Magnets have 2 poles called north and south The north and south poles attract	There are three types of rock: Igneous, sedimentary and metamorphic.  Igneous rocks are made when Lava cooled creating crystal like structures e.g. basalt, granite and pumice Sedimentary rocks are formed from layers of sediment collecting and solidifying, these rocks have layers throughout e.g. limestone, sandstone, shale. Metamorphic rocks are formed when other rocks are affected by great temperature or pressure e.g. gneiss, marble, slate	The roots of a plant are to anchor it to the earth and collect nutrients from the ground  The stem in a plant transports food around a plant  The flower of a plant attracts wildlife to help transport pollen from flower to flower which will help make new plants.	Name the seven different types of nutrition that humans (and named animals) need Describe the role of carbohydrates, proteins, fats, water in diet *The effects of various vitamins and minerals of human health

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	<p>light to pass and do not create a shadow</p> <p>The angle of the light affects the length of the shadow.</p> <p>Your shadow will be shortest at midday and longer early in the morning and evening</p>	<p>North to north or south to south poles repel</p> <p>Some metals are magnetic but not all metals are magnetic</p> <p>Different surfaces create different amounts of friction</p> <p>The amount of friction created by an object moving over a surface depends on the roughness of the surface and the object</p>	<p>Know that rock can be classified using properties such as hardness, permeability and durability</p> <p>Soil is the uppermost layer of the Earth. It is a mixture of different things: • minerals (the minerals in soil come from finely broken-down rock); • air; • water; • organic matter (including living and dead plants and animals).</p> <p>There are different soils including sandy and clay soil</p> <p>A fossil is the preserved remains or impressions of a living organism such as a plant, animal, or insect. Some fossils are very old. Studying fossils helps scientists to learn about the past history of life on Earth.</p>	<p>Flowers turn to fruit which contain seeds.</p> <p>The requirements of plants for life and growth are: air, light, water, nutrients from soil, and room to grow.</p>	<p>The main bones and joints in the human skeleton (and animals)</p> <p>The main muscles in the human body (and some animals)</p> <p>Describe the role of the skeleton and muscles in support, protection and movement.</p> <p>Muscles work in pairs And crate movement by contraction and relaxation</p>
Key learning	<p>Link to prior learning – Y1 senses – sight Link forward – Y6 Light</p> <p>* Sorting light sources and not light sources with pictures. Some objects appear to be light sources but instead reflect the light from sources e.g. moon, bike reflectors. (classifying)</p> <p>* <b>Key question: can we see in the dark?</b> Comparative test with object inside box. Torch shone through hole to illuminate object. Establish that we need light to see, and that darkness is the absence of light.</p>	<p><b>Scientist: Sir Isaac Newton (1642 – 1727) - PHYSICIST</b> – established the three laws of motion</p> <p>* Find push and pull forces in the classroom and label with post its. Sort objects or actions which use push/pull forces into Venn diagram (gathering, recording, classifying and presenting data in a variety of ways to help in answering questions) Link forward – Y5 Forces</p> <p>* Key question: <b>On which surface will the car travel</b></p>	<p>* Bridge back to Y2 materials and link to geography. Where can we find rock in our school grounds?</p> <p>Tell chn that most rocks are naturally occurring and there are different types of rock which are formed in different ways. VOCAB: igneous, sedimentary, metamorphic</p> <p>* Name rock samples using secondary sources and sort into sedimentary, igneous and metamorphic – draw/label a simple diagram to show the rock cycle. (identifying differences, similarities or changes related to simple scientific ideas and processes)</p> <p>* Name rock samples using secondary sources and sort into categories based on their appearance (gathering, recording, classifying and presenting data in a variety of ways to help in answering questions)</p> <p>* <b>Key question: which rock is the hardest?</b> Devise a simple test to classify rocks by their hardness. Look for patterns when drawing</p>	<p>Link to prior learning - Y2 parts of plant/conditions for growth</p> <p>* Compare different plants – cactus, fir tree, waterlily, rice plant, and snowdrop. Key Questions: Which plant needs the most water? Which plant needs the highest temperature? Which plants could survive in the UK? (identify differences/ similarities, explore and answer questions)</p> <p>* Recap names of parts of a flowering plant (Y2 bean plant). Explore and discuss the idea that every part</p>	<p>Link to prior learning – Y2 what humans need to be healthy</p> <p>* Recap on living things – sort selection of photos into plants and animals. Revise basic needs for survival of living things; establish that plants produce their own food, whereas animals eat other living things (herbivores, carnivores, omnivores). Link forward to Y6 circulatory system/keeping healthy</p> <p>* Recap what constitutes a healthy, balanced diet for humans. Zoom in on nutritional values of</p>

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	<p>(recording findings using simple scientific language, drawings, labelled diagrams)</p> <p>* Key question: <b>How do we see?</b> Diagram to show light travelling from a light source to our eyes. Learn not to look at the sun directly and how to Protect our eyes. (recording findings using simple scientific language, drawings, labelled diagrams)</p> <p>* Investigation: (comparative test) - which material reflects light the best? Set up investigation and record results and conclusion.</p> <p>* <b>Key question: what are shadows?</b> Investigate shadows using torches and a range of opaque, translucent and transparent objects. Observe differences. Draw a diagram to explain how shadows are formed. (careful observations, pattern seeking)</p> <p>* <b>Key question: Do shadows always stay</b></p>	<p><b>furthest? (fair test)</b> Present results in a bar chart. Use the conclusion to introduce the word friction as the force slowing the object down (recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables)</p> <p>* <b>Key question: Does a magnet have to touch the object to attract it?</b> Investigate magnetism of different objects through a piece of paper/card; through the table; from various distances. Establish magnetism as a non-contact force</p> <p>. * Observe that magnets will attract some objects. Use magnets to find and group materials that are magnetic. <b>Key question: Which materials are magnetic?</b> (gathering, recording, classifying and presenting data in a variety of ways to</p>	<p>conclusions e.g. metamorphic rocks are harder. (recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables)</p> <p>Link forward to Y6 – Mary Anning + Evolution</p> <p>* Observe a range of fossils. Research using secondary sources how fossils are formed and establish a link between most fossils and sedimentary rocks (careful observation, use research to ask and answer questions) * <b>Key question: what is soil?</b> Use secondary sources to understand how soil is formed. Observe a range of soils closely and classify them based on their appearance and what each is made from.</p> <p>* <b>Key question: which is the most absorbent soil?</b> Children devise a comparative test to find out how long it takes water to drain through soil samples. Children present findings using a bar chart and make conclusions. (recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables)</p>	<p>has a job to do: leaf (food), root (nutrition), stem (support), flower (reproduction).</p> <p>Revise conditions to grow (air, light, water, warmth) and develop (nutrients room soil, and room to grow).</p> <p>Record using detailed labelled diagram, including functions. (careful observations, discuss relationship between structure and function)</p> <p>* Zoom in on flowers - explore life cycle of flowering plants and the part flowers play - pollination, seed formation, seed dispersal.</p> <p>* Investigation: (pattern seeking) - <b>How does water travel around a plant?</b> Complete carnation/food colouring investigation (explore questions, observe over time, use observations to answer questions)</p>	<p>different supermarket produce using food labels. <b>Key Questions: Which food do you think contains the most.....? (Fat, sugar, salt, fibre etc.)</b> (use research to ask and answer questions)</p> <p>* Investigation: (pattern seeking) – conduct a survey asking staff about their breakfast and lunch. Share and discuss answers - design a daily diet containing a balance of nutrients.</p> <p>* Group pics of animals - with a skeleton / without a skeleton. Vocab: SKULL, SPINE, RIBS, PELVIS. Match skeletons to animals. (careful observations; identify differences/ similarities; identify, group and classify)</p> <p>* Observe the effect of a skeleton on support (spine), protection (skull) and movement (pelvis). Address misconceptions e.g. slug/snake, exoskeletons etc.</p>
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	<p><b>the same size?</b> Investigate how to change a shadow's size by moving the torch towards and away from an object. Stem sentence: The closer to the light source an object is, the bigger the shadow will be. (pattern seeking)</p>	<p>help in answering questions)</p> <p>* Observe that magnets have a north and a south pole. Observe which poles attract and repel. Use a marked magnet to find and mark unmarked poles on another magnet (using straightforward scientific evidence to answer questions or to support their findings</p>		<p>Key Question: <b>What would happen if humans didn't have a skeleton?</b> (careful observations; explore ideas)</p> <p>* Explain the purpose of muscles for movement and maintaining body positions, including the heart (internal). Key Question: <b>Where can we see muscles on our body?</b> (careful observations; identify differences/ similarities)</p>
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**Year 4**

<p><b>Disciplinary Knowledge</b> ( Working scientifically)</p>	<p><b>Planning and Predicting</b> Recognise why it is important to collect data to answer questions</p> <p>Suggest questions that can be tested</p> <p>Put forward ideas about testing and make predictions</p> <p>Begin to design own tests identifying and managing variables</p> <p>With help, consider what constitutes a fair test</p>	<p><b>Investigating and Observing</b></p> <p>Set up simple practical enquiries and begin to make decisions about which equipment is appropriate for investigations</p> <p>Make relevant observations and comparisons</p> <p>Make measurements of temperature, time weight, length and volume with increasing accuracy. Using a range of equipment including thermometers, rulers, stopwatches, measuring jugs/ cylinders and data loggers</p> <p>Begin to think about why measurements may need repeating to check accuracy</p> <p>With help, carry out a fair test recognising and explaining why it is fair</p>	<p><b>Recording, analysing and evaluating</b> Explain what the evidence shows in a scientific way and whether it supports predictions</p> <p>Suggest improvement to their work</p> <p>Record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables</p> <p>Comment on findings of other investigations compared to own and how they support or contradict</p> <p>Draw conclusions with clear evidence, suggest improvements and raise further questions for possible further investigation</p>
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		Identify criteria for classification , use and create simple keys				
<b>Disciplinary Knowledge</b> ( Second order skills)	<p><b>Similarity and Difference:</b> Make comparisons and note differences Identify similarities and differences whilst understanding how to be responsible scientist</p> <p><b>Responsibility:</b> Understand how to be a responsible scientist, thinking fairly and comparatively. Understand the impact of breaks in food chains and how they can become unsustainable</p> <p><b>Continuity and Change:</b> Observe what changes and what stays the same within a habitat. Identify continuity and change whilst understanding how to be responsible scientist</p> <p><b>Written and Oral Expression:</b> Present findings orally, in written form and through presentations. Use scientific terminology and explain processes.</p> <p><b>Significance:</b> Discuss and understand scientific discoveries and theories</p>					
KEY Concept Vocabulary	Compare Classify Characteristic Impact Patterns		KEY Topic Vocabulary	Vertebrate , Invertebrate , Key, Solid, Liquid, Gas, Evaporate, Condensation, Precipitation , Circuit, Switch Conductor, Insulator, Vibration , Pitch, Volume, Digest, Digestive system (names of organs/teeth)		
TERM	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
NC Links	<p><b>Living things and their habitats</b> Recognise that living things can be grouped in a variety of ways</p> <p>explore and use classification keys to help group, identify and</p>	<p><b>Living things and their habitats</b> Recognise that living things can be grouped in a variety of ways; explore and use classification keys to help group, identify and name a</p>	<p><b>States of matter</b> Compare and group materials together, according to whether they are solids, liquids or gases;</p> <p>observe that some materials change state</p>	<p><b>Electricity</b> Identify common appliances that run on electricity;</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts,</p>	<p><b>Sound</b> 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</p>	<p><b>Animals, including humans</b> Describe the simple functions of the basic parts of the digestive system in humans; identify the different types of teeth in humans and their</p>

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	<p>name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p>	<p>variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p><b>States of matter</b> 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)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>including cells, wires, bulbs, switches and buzzers;</p> <p>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;</p> <p>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit;</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p>	<p>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.</p>	<p>simple functions; construct and interpret a variety of food chains, identifying producers, predators and prey.</p>
<p>Key Question</p>	<p><b>What is a slug?</b></p> <p><b>What bird is this?</b></p>	<p><b>How can I improve my local environment?</b></p> <p><b>Can you pour a solid?</b></p>	<p><b>Why does it rain?</b></p> <p><b>How can speed up evaporation?</b></p>	<p><b>How can I make a bulb light up?</b></p> <p><b>Can I make a bulb light up without wire?</b></p>	<p><b>Why some are sounds louder than others?</b></p> <p><b>Can sound travel through solid objects?</b></p>	<p><b>What animal would have this tooth?</b></p>

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<p><b>Substantive knowledge</b></p>	<p>All living things can be classified or sorted through their similarities and differences</p> <p>Living things can be grouped into plants and animals</p> <p>Animals can be grouped into vertebrates and invertebrates</p> <p>Vertebrates have endo skeletons</p> <p>Invertebrates do not have an internal skeleton</p>	<p><b>Living things continued</b></p> <p>Changes to habitats can affect or endanger living organisms</p> <p><b>Introduction to states of matter</b></p> <p>Solids like rocks have particles that are very close together and do not allow much movement</p> <p>Solids have a fixed shape</p> <p>Liquids have particles that can move more freely. They have a fixed volume but can take the shape of their container.</p> <p>Gases have particles that can move freely and have no fixed shape or volume</p>	<p><b>States of mater continued</b></p> <p>Materials change state when they are heated or cooled</p> <p>Water freezes at 0 degrees Celsius</p> <p>Water boils at 100 degrees Celsius</p> <p>Water evaporates as it warms into a gas and condenses when it cools back to water</p> <p>Evaporation and condensation have a key role in the water cycle</p> <p>Rate of evaporation can be increased by warming</p>	<p>A simple series electrical circuit need to have a complete loop from one end of a battery to the other</p> <p>A circuit may contain basic parts including cells, wires, bulbs, switches and buzzers.</p> <ul style="list-style-type: none"> <li>• Know a circuit with a break in it that isn't a loop will not light</li> <li>• A switch opens and closes a circuit and creates an incomplete loop which causes a light not to light.</li> <li>• Conductors allow electricity to flow easily through them – metals are good conductors</li> </ul> <p>Insulators do not let electricity flow easily through them.</p>	<p>Sound travels in waves</p> <p>To make a sound something has to vibrate</p> <p>Sound needs to travel through something like air to the ear</p> <p>Sound can be blocked</p>	<p>Know that a food chain always starts with sunlight passing energy to a plant</p> <p>Name the parts of the digestive system and their role</p> <p>Know we have incisors for slicing, molars for grinding and canine teeth for ripping</p> <p>Know that sugary foods and acidic drink can cause a build-up of plaque which leads to tooth decay. Give ways in which you can keep teeth healthy</p>
<p><b>Key learning</b></p>	<p>Link to prior learning - Y1 classification; Y2 identify/ name plants and animals in local environment</p> <p>* Recap on vocab from prior learning: HABITAT, VERTEBRATES,</p>	<p>* Key Question: <b>How can I improve my local environment?</b></p> <p>Recap on negative impact of one factor changing in habitat (food chain from last lesson). Emphasise that, unlike humans, plants and animals</p>	<p>Discuss freezing/boiling points of water - recap on particles. Demonstrate how to use a thermometer (THERM – Greek – 'heat')</p> <p>Measure and record temperatures in °C (Celsius) of icy water, tap water, hot water, boiling water (demonstration).</p>	<p>* Explain electricity as a source of energy. Use secondary sources to identify everyday appliances that run on electricity. Categorise further into mains/battery, including devices that can be recharged.</p>	<p>Link to prior learning – Y1 body parts associated with senses</p> <p><b>Key Question: Why are some sounds louder than others?</b></p> <p>* Children draw/write: How I think we hear sounds. Children</p>	<p>Link to prior learning – Y1 herbivores, carnivores, omnivores; Y2 food chains; Y3 food nutrition</p> <p>* Recap on herbivore, carnivore, omnivore + simple food chains. Introduce terms</p>

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	<p><b>INVERTEBRATES</b> Recap on how we know something is alive (Y2) but formalise this using MRSGREN mnemonic. (Link forward – Y5 revision of MRSGREN</p> <p>* Provide a selection of photos of living things, including the five vertebrate groups, invertebrates, flowering plants and grasses, and non-flowering Plants. Tell children to sort the photos into the five vertebrate groups. Can they create/label any new groups with the leftover photos? (classify and present data in a variety of ways)</p> <p>* Revise MRSGREN Talk through/model how to use a classification key using a photo from last lesson. Then create a key as a whole class with children coming up with yes/no questions. Evaluate effectiveness of their questions at each point. Can the children work in small groups to complete their own classification key for one plant/animal? (gather,</p>	<p>cannot easily relocate to new habitats if there is a negative change</p> <p>. Children generate questions to explore examples of natural changes (e.g. seasonal, flood, fire, earthquakes) and human changes (both positive and negative). Children explore, discuss and suggest ways to support habitats and explain why their suggestion is positive.</p> <p><a href="#">Introduction to states of matter</a></p> <p>Link to prior learning – Y1, Y2 materials</p> <p>* Key Question: <b>Can you pour a solid?</b> Sort a selection of materials – solids, liquids, gases. Include sugar (and/or salt/flour) + water in different forms as a solid/liquid/gas.</p> <p>* Attribute properties to solids, liquids, gases, introducing the vocab PARTICLES and answering the key question. Link</p>	<p>*Investigation: (comparative test) – Which substance has the highest melting point? Set up investigation to find and record the melting point of ice, margarine, butter and chocolate. Make predictions. Measure using thermometer °C. Record on bar chart and analyse/interpret results. (measure, record and present data using tables and charts; report on findings, including oral and written explanations and conclusions)</p> <p>* Key Question: <b>Why does it rain?</b> Observe water evaporating and condensing (e.g. kettle boiling/steam on window); recap on particles/state of matter. Link to geography + use secondary sources to find out about the water cycle, associating the rate of evaporation/condensation with temperature. Draw detailed diagram explaining each stage. (record using simple scientific language, drawings, labelled diagrams)</p>	<p>Discuss portability and voltage in terms of safety with battery-powered devices, Explore and discuss ways of working safely with electricity . Link forward – Y6 Electricity * Vocab: CIRCUIT</p> <p>Name/picture match basic electrical components: cell/battery, wire, bulb, And buzzer, motor <b>Key Question: How can I make the bulb light up?</b> Provide all components and challenge them to light up a bulb. Identify similarities in successes to establish idea of a complete loop. Children draw circuit; say why it worked. Role play to show directionality of current flowing around a circuit, addressing any misconceptions about movement of electrons.</p> <p>Picture predictions for four open/closed circuits, giving reasons. (ask relevant questions and use different types of</p>	<p>play/listen to variety of instruments. Discuss preferences, pitch, and volume. Feel/see vibrations as instruments are hit/blown/plucked. Vibrations (sound waves) = energy.</p> <p>Vary volume and link to strength of vibrations (louder sound = more energy) (ask questions and make careful observations to answer them; report findings, including causal explanations)</p> <p>* Recap on link between hearing sounds and something vibrating. Recap on prior learning of states of matter – solids, liquids, gases. <b>Key Question: Can sound travel through solid objects?</b> Test sound travelling through wooden block, water, air.</p> <p>Recap on movement of particles in solids, liquids and gases – know that sound energy (vibrations) travels through particles to ear, and that this happens</p>	<p>‘producer’, ‘prey’, ‘predator’. Interpret given food chains using these terms. Construct own food chains. (record using simple scientific language, drawings, labelled diagrams)</p> <p>* Zoom in on teeth. Show teeth from herbivores, carnivores, and omnivores including humans. Children speculate on functions of teeth, suggesting reasons for differences.</p> <p><b>Key Question: What animal would have this tooth?</b> Label jaws of different animals, including human - identify types of teeth, their function, and herbivore/carnivore/omnivore. (compare, suggest reasons for differences)</p> <p>* Zoom in on human teeth. Recap four types of teeth. Children suggest things that damage teeth + how to look after them. Investigation: (changes over time) – <b>Are fizzy drinks bad for our teeth?</b> Initial yes/no</p>
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<p>record, classify and present data in a variety of ways to help in answering questions)</p> <p>* Go into school grounds – what invertebrates can we find? Take photos/name these. Back in class, present children with <b>Key Question: What is a slug?</b> Use prepared classification key and photos to sort familiar and unfamiliar invertebrates: mollusc (slugs, snails), Annelida (earthworms), Arachnids, insects.</p> <p><b>Focus initially on the slug</b> in order to answer the Key Question and then move on to other photos to group and classify in the same way. (identify and study plants and animals in the local environment; gather, record, classify and present data in a variety of ways to help in answering questions)</p> <p>* Zoom in on local birds. <b>Key Question: What bird is this?</b> Provide children with photos of birds found in local environment but</p>	<p>forward to Y5 Change of State (compare, suggest reasons for differences)</p> <p>* Recap on previous lesson by role-playing how particles behave in solids, liquids, gases. Explore the changing states of water when heated and cooled:</p> <p>Vocab – EVAPORATE/ EVAPORATION, CONDENSE/ CONDENSATION Draw detailed diagrams explaining how behaviour of particles changes when a substance is heated/cooled. (give oral and written explanations) *</p>	<p>Investigation ( comparative/ fair test) <b>What can we do to speed up evaporation?</b> Consider all the factors which may affect the rate of evaporation? How does temperature affect how a towels dry? (Make predictions, what must we keep the same? Recording results in table/ bar chart. Presenting findings and drawing conclusions.</p>	<p>scientific enquiries to answer them)</p> <p>* Investigation: (comparative test) – <b>Can I make a bulb light up without using wire?</b> Planning – Children to suggest a range of everyday objects/materials for testing. Make predictions. (ask relevant questions; set up simple comparative tests)</p> <p>* Vocab: CONDUCTOR INSULATOR Investigation (comparative test) – Record results in table – establish material not object that conducts electricity. Conclusion – use vocab of conductor and insulator. Discuss when insulators are needed – link back to safety – note coating on wires – use wire strippers to reveal copper beneath. (make systematic and careful observations; gather, record and present data using simple scientific language and tables; report on findings, including oral</p>	<p>quicker through solids (because they are closer together) and slower through gas (further apart).</p> <p>* Investigation: (pattern seeking) – <b>Are higher sounds always quieter?</b> Children explore pitch (speed of vibrations) using same objects but of different sizes (e.g. varying sized metal saucepan lids, rulers on table at different lengths, elastic bands of different thicknesses, different water levels in bottles). Measure and record pitch, varying volume. - Conclusion: pitch/speed of vibrations is determined by the shape of the object not the strength of the vibrations. (set up simple practical enquiries; take accurate measurements; gather, record and present data, using simple scientific language; present simple conclusions, using straightforward scientific evidence to support their findings)</p>	<p>responses + why. Explain egg/liquid experiment – children to suggest four liquids that could be used, considering the need for a range of effects on teeth. Take predictions/reasons. (ask questions, suggest ways to answer them, set up simple practical enquiries)</p> <p>* Set up egg/liquid experiment using liquids suggested by children.</p> <p>* 3-4 days later, check eggs, gather/record results using tables/diagrams, draw conclusions, giving reasons and using scientific vocab (systematic and careful observations, record findings using tables, report on findings, draw simple conclusions) Link forward – Y6 recap of all human systems</p> <p>Vocab: DIGEST</p> <p>Explain the term ‘digestive system’. Children to draw: ‘What I think the digestive system look like ‘</p>
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	<p>not named at this point: wood pigeon, magpie, crow, sparrow, jay, and jackdaw. Children create questions for a whole class classification key which could help Key Stage 1 children identify each bird. Test questions to ensure the key works. Children can add labels to their key as they identify each one. (identify and study plants and animals in the local environment; raise and answer questions; classify and present data in a variety of ways to help in answering questions)</p> <p>Link to prior learning: Y2 food chains; flowering plants; habitats and basic needs for survival * <b>Key Question: Do we need invertebrates?</b> Revise 'invertebrates' and 'habitat' + names of birds found in school grounds from last term. Children record: Why I think the school grounds are a good habitat for birds. Look at diet of six birds. Children use simple food chain model to answer question,</p>			<p>and written explanations and conclusions)  <b>Scientist: Walter Hawkins (1911 – 1992) – CHEMIST - invented the plastic coating on telephone wires, making universal service possible</b></p> <p>* Zoom in on switches. Recap on the effect of conductors and insulators on simple circuits; consider why we may want to open a circuit and how we do this (switches). Children explore different types of switch, and discuss possible uses for each.</p> <p>Design a simple circuit that includes the best switch for a given purpose. (Use straightforward scientific evidence to support their findings and extrapolate their ideas.</p>	<p>* Recap on sound waves (energy) travelling through particles to ear. Discuss whether they think sounds get fainter the further you move away from them. Investigation: (comparative test) – <b>Do sounds still get fainter if I move away in a different direction?</b></p> <p>- Plan, identifying variables, and predict</p> <p>* Investigation – record and conclude. Place iPad playing music in the middle of the playground; children move away in different directions to prepared distances, recording loud, medium or quiet volume at each position. Share results – sound waves travel in all directions, getting fainter (less energy) the further they travel. - What do you think would happen if sound waves never lost their energy? (set up simple comparative tests; gather, record and present data, using simple scientific language; present simple conclusions,</p>	<p>Secondary sources - models/images of digestive system - ask questions to understand functions of main parts: mouth, tongue, teeth, oesophagus, stomach, small and large intestine, rectum, anus.</p> <p>Draw/label detailed diagram. (draw and discuss ideas, explore questions, record using scientific language and labelled diagrams)</p> <p>* Retrieval of main parts of digestive system. Practical demonstration of function of these parts. Children to record (write/draw) explanation for each step using scientific vocab. (careful observations, oral and written explanations)</p>
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	<p>explaining impact of removing invertebrates. (raise and answer questions; record conclusions and explanations using simple scientific language, drawings, labelled diagrams; use straightforward scientific evidence to answer questions or to support their findings)</p>				<p>using straightforward scientific evidence to support their findings)</p>	
<p><b>Year 5</b></p>						
<p><b>Disciplinary Knowledge</b> ( Working scientifically)</p>	<p><b>Planning and Predicting</b> Recognise that scientific ideas are based on evidence and creative thinking</p> <p>Make predictions based on scientific knowledge</p> <p>Suggest methods of testing including a fair test</p> <p>Suggest how to collect evidence</p> <p>Select suitable equipment</p>	<p><b>Investigating and Observing</b> Carry out a fair test explaining why it is fair</p> <p>Understand why observations need to be repeated</p> <p>Select information from provided sources</p> <p>Take measurements using a range of scientific equipment (including force metres and thermometers) with increasing accuracy and precision, taking repeated measurements where appropriate</p>	<p><b>Recording, analysing and evaluating</b> Communicate findings in a variety of ways</p> <p>Identify simple trends and patterns.</p> <p>Offer explanations for these trends and patterns</p> <p>Communicate findings in tables bar charts and line graphs making appropriate use of ICT</p> <p>Draw conclusions and communicate them with appropriate scientific language</p> <p>Suggest improvements to their giving reasons</p> <p>Use test results to make predictions and set up further comparative and fair tests</p> <p>Report findings from enquiries including conclusions, causal relationships and explanation of and degree of trust in results</p>			

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<b>Disciplinary Knowledge</b> ( Second order skills)	<b>Written and Oral Expression:</b> Explain processes, describe and explain patterns and draw conclusions using scientific terminology where appropriate. Present data, drawing conclusions. Report and present findings from enquiries including conclusions, explanations, data and diagrams <b>Responsibility:</b> I can work safely, objectively, responsibly, fairly and comparatively. Have understanding of how science can solve problems for example climate change and sustainability <b>Significance:</b> I understand significant laws such as magnetism, heat conduction and others involving metals. Identify scientific evidence that has been used to refute or support ideas or arguments <b>Similarity and Difference:</b> Make comparisons, note differences and draw conclusions					
<b>KEY Concept Vocabulary</b>	Variable Fair test Evidence Conclusion properties		<b>KEY Topic Vocabulary</b>	Life –cycle, Childhood, Adolescence, Adulthood, Puberty Reproduction, Offspring, Dissolving, Separating, Reversible Irreversible, Thermal insulator, Thermal conductor , Gravity Resistance, Friction, Solar System, Star, Planets, Orbit, Rotate		
<b>TERM</b>	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>NC Link</b>	<b>Living things and their habitats</b> 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, including the comparison of those in the local environment with those in other parts of the world	<b>Forces</b> 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.	<b>Properties and changes of materials</b> Compare and group together everyday materials on the basis of their properties; 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; give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials; 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.		<b>Earth and Space</b> 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.	<b>Animals, including humans</b> Describe the changes as humans develop to old age, including changes at puberty

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Key Question	<b>Do all insects go through a metamorphosis?</b>	<b>How can I speed up or slow down a moving object?</b>	<b>What are the properties of materials and how do they influence their use?</b>	<b>How does the rotation and tilt of the earth affect our lives?</b>	<b>How do we change in our lives?</b>
Substantive knowledge	<p>The life cycle of plant generally is from seed to germination to small flower to flowering plant to fruit to seed although some plants have bulbs and some plants reproduce asexually.</p> <p>Not all animal life cycles are the same- some plants and animals lay eggs others give birth to live young</p> <p>Life cycles in animals varies with some young growing bigger but some undergoing large metamorphosis e.g. butterfly or frog</p>	<p>Objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Friction, air resistance and water resistance act upon an object to slow it down</p> <p>An object will continue in the same direction at the same speed unless another force acts upon it</p> <p>Pushes and pulls are forces</p> <p>Levers and pulleys allow heavy weights to be lifted</p>	<p>All materials have properties such as whether they can conduct electricity etc.</p> <p>Materials are made of particles</p> <p>Chemical changes are generally irreversible</p> <p>Chemical changes involve the creation of a new material</p> <p>Physical changes can often be reversed</p> <p>Solutes dissolve in a solvent to make a solution</p> <p>Materials can be separated depending upon their properties using filtration, condensation, separation etc.</p>	<p>All planets orbit the sun</p> <p>The moon orbits the earth and is lit by the sun. It does not have its own light source.</p> <p>The sun is our nearest star</p> <p>A twenty-four hour day is a full rotation of the earth.</p> <p>Night occurs when the earth is not facing the sun and day when the earth is facing the sun.</p> <p>Seasons are dependent on the hemisphere.</p> <p>The moon's phases occur due to its position around the earth in relation to the sun</p>	<p>Humans change and grow throughout their lives</p> <p>Stages of human life cycle are: Baby, toddler, child, adolescent, adult, elderly person.</p> <p>Changes during adolescence are called puberty.</p> <p>Main changes in puberty for a girl and boy.- reasons for these changes</p> <p>How adults change in later life name some of the challenges this causes</p>
Key Learning	<p>* Recap on characteristics of life (MRS GREEN). Zoom in on REPRODUCTION. Explain sexual reproduction involving two parents/egg and</p>	<p>Link to Y3 forces – what is a force? Demonstrate balanced and unbalanced forces through pushes and pulls.</p>	<p>Link to prior learning – Y1, Y2 materials; Y4 states of matter</p> <p>* Recap – establish difference between object, material, and property. Provide selection of everyday objects of various materials, including those that are transparent, reflective, and conduct</p>	<p>Link to prior learning: Y1 seasonal changes/varying day length</p> <p>* Draw/label: My ideas about the Sun, Earth</p>	<p>Link to Y2/previous Y5 work on life cycles + PSHE Growing and Changing * Recap on life cycles and concept of growing and changing over time.</p>

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<p>sperm. Revise characteristics of mammals.</p> <p>Investigation: (pattern seeking) – <b>Do all mammals have the same life cycle?</b>          Research life cycle of a mammal of their choice. Discuss and compare findings to establish a rule for mammalian life cycles (3 stages: birth, young, adult) (identify evidence to support ideas or arguments)</p> <p>* Recap on mammalian life cycles; discuss other familiar life cycles – chicken (bird), frog (amphibian), butterfly/moth (insect) – sexual reproduction</p> <p>. Vocab: METAMORPHOSIS In groups, research the life cycles of other examples of birds and amphibians to establish rules: bird – 4 stages: egg, hatchling/young, fledgling/juvenile, adult amphibian – 4 stages: egg, tadpole/larvae, young, adult (including metamorphosis) (identify evidence to</p>	<p>Vocab: Gravity</p> <p><b>Key question: The heavier the object, the faster it falls.</b>          Observe the effect of gravity on falling objects. Devise an investigation to prove or disprove the theory that heavier objects fall faster. Explain results and draw conclusions. (close observations, identify evidence to support ideas or arguments, pattern seeking)          TEACHER’S NOTE – this statement is not correct: because gravity is a constant force, all objects fall at the same rate. The weight of an object will not affect the affect the speed at which it falls.</p> <p>Introduce the terms air resistance/water resistance and how these slow objects down. Link to previous lesson. <b>Key question: How can we make the best parachute?</b>          Possible variables to explore and discuss – material used, size of</p>	<p>heat/electricity. Discuss why these materials may have been chosen for their particular object/use. Draw/select image(s) of object(s) and label material and how its properties are key to its purpose. Sort materials according to their properties</p> <p>Devise and carry out simple comparative test to compare simple properties such a flexibility, transparency, hardness- organise results using tables and discuss findings – consider any short comings of tests.</p> <p>Consider what is meant by thermal conductivity. Examine types of materials which keep cold things cold and hot things hot.          Plan and carry out a fair test - Which material will keep my teachers drink the warmest for longest?          Consider variables which need controlling- plan fair test. Each group to carry out investigation in same way to test reliability of results. Plot how liquid cools over time measuring temperature. Use of line graph to record. Draw conclusion and report on findings orally and in written form.          * Recap on properties of materials and states of matter/particles – ensure children recognise liquids and gases as materials, as well as solids.</p> <p>Vocab: DISSOLVE Investigation: (changes over time) – Does salt vanish when you put it in water? Make predictions. Plan and set up investigation - dissolve salt in water – record observations. Pour onto shallow dish, leave in warm place overnight, and observe/record evaporation of water and salt crystals left behind. Link to salt water in sea/sugar in tea – still taste salt/sugar even when dissolved, therefore not vanished. Vocab: SOLUTION (present findings, including conclusions and explanations; identify evidence to support ideas or arguments)</p> <p>What questions can you ask about dissolving?  <b>Key question :What can speed up dissolving ?</b>          Revisit variables what could change effect</p>	<p>and Moon – encourage them to show a sense of size, movement, anything else they know. Vocab: STAR PLANET ORBIT Key Question: Does the sun rise and set every day on Earth? Secondary sources/model - demonstrate heliocentric solar system: orbit of eight, roughly spherical planets, around a central star. Discuss Earth’s rotation on a slanted axis leading to daytime and night-time. Through research and further discussion, children present/explain the movement of the Sun across the sky as a result of the Earth rotating.</p> <p><b>* Key Question: If it’s daytime in England, is it also daytime in Australia?</b> Research, using secondary sources, the time of day in different places on Earth, comparing these across a world map as supporting evidence of the Earth’s rotation. Create labelled diagrams to explain day and night in different parts of the</p>	<p>Zoom in on humans to create an information timeline indicating developmental stages: infant, toddler, child, adolescent, adult, late adulthood</p> <p>* (Changes at puberty covered through PSHE lessons/Christopher Winter resources) *          Vocab: GESTATION Zoom in on human gestation. Research the stages of human gestation, making careful observations to label developmental stages for each trimester.</p> <p>* Recap length/stages of human gestation period. Investigation: (pattern seeking) - Do larger mammals have longer gestation periods? Children discuss and decide how much data is needed to create a pattern in results, and what mammals would give an adequate size-range (based on weight). Carry out research on these grounds. Record results on table and graph. (research using secondary sources;</p>
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	<p>support ideas or arguments)</p> <p>* Revise life cycle of butterfly/moth – 4 stages: egg, larva (caterpillar), pupa (chrysalis or cocoon), and adult – sexual reproduction. Link to amphibians - metamorphosis. Investigation: (pattern seeking) - <b>Do all insects go through a metamorphosis?</b> Carry out research, record table of results – name of insect, stages of life cycle, yes/no metamorphosis. Share and compare findings. Write an explanation of insect life cycles – complete metamorphosis (4 stages) and incomplete metamorphosis (3 stages). (present findings, including conclusions and explanations; identify evidence to support ideas or arguments)</p> <p>Vocab: ASEXUAL Investigation: (changes over time) – Do all plants grow from seeds? Explore asexual plant reproduction using</p>	<p>parachute, shape of parachute, height of drop, (careful observations; take measurements with increasing accuracy and precision; record data using scientific diagrams, labels, tables; present findings from enquiries, including conclusions, in oral and written forms) Investigate simple mechanisms involving pulleys (flagpoles, window blinds), levers (scissors, opening paint can, see saw) and gears (bikes).</p> <p>How can they help us to create a bigger force? Children draw diagrams to show levers, pulleys and gears, and explain how they help us to create a bigger force. (present findings from enquiries)</p>	<p>dissolving ? Plan own question to investigate keeping all other factors the same – Plan and carry out a fair test to answer question – record findings in graph/ table form . Draw conclusions to answer question – comment on reliability of results.</p> <p>* Recap on separation in last session. Explore how to separate different mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. (plan different types of scientific enquiries to answer questions; report and present findings from enquiries, including explanations) Provide children with a mixture of salt, sand, paper clips and buttons which can be separated in different ways can they apply knowledge to separate these things</p> <p>* Vocab: REVERSIBLE, IRREVERSIBLE Recap on changes to materials: dissolving (Y5) evaporating, condensing, melting, freezing (Y4) Explain as reversible changes. Explore non-reversible changes – lighting a match/baking a cake, mixing bicarbonate of soda with vinegar, rust. Explain that irreversible changes always create a new material. Record reversible and non-reversible changes. (present findings, including conclusions and explanations; identify evidence to support ideas or arguments)</p>	<p>world at the same time. (report and present explanations in oral and written forms, identifying scientific evidence to support ideas or arguments)</p> <p>Vocab: SATELLITE Zoom in on the Moon. List things that orbit the Earth. Establish moons as satellites of planets – Earth has one Moon, other planets have more. The Moon’s orbit of the Earth interacts with the Earth’s orbit of the Sun. Key Question: <b>Why does the moon seem to change shape?</b> Use models and secondary sources to demonstrate the elliptical orbit of the moon and how this means the moon is sometimes closer and sometimes further away. Address misconceptions, such as Moon as light source, being able to see ‘all’ of the Moon. Create detailed, labelled diagram of phases of the Moon.</p> <p>* Discuss the importance of evidence in scientific study and when presenting</p>	<p>record and present data using tables and graphs)</p> <p>* Interpret data to write conclusion, including any anomalies. Use data to predict gestation periods of three animals of varying size not listed. Carry out further research to see if these fit the pattern. Analyse results to gauge whether data obtained could be extrapolated to make further predictions. (use data to make further predictions; report and present findings in oral and written form, including conclusions and causal relationships)</p>
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	<p>examples of tubers, runners, plants and bulbs.</p> <p>Create detailed diagrams of the life cycle of plants that reproduce sexually and plants that reproduce asexually. Identify similarities with life cycles of animals (germination, growth, reproduction, death)</p> <p>* Investigation: (changes over time) Children identify plants in their local area, looking for evidence of plant reproduction such as flowers, seeds heads, berries and fruits. They may also observe the types of pollinators in the vicinity or visiting the plants. Use photos and notes from observations to record their findings. Children to revisit the same plants each term to see if the signs of reproduction have changed with the seasons.</p>			<p>scientific theories and ideas. Discuss the evidence available to the early  <b>ASTRONOMERS:</b>          Aristotle and Ptolemy's geocentric view compared with Copernicus and Galileo's heliocentric ideas</p> <p><b>Key Questions: Has the Earth ever been flat?</b> Discuss shape of the Earth and how we know – evidence! Explain that the Earth was once believed to be flat, based on the evidence at the time, and that some people still believe this to be the case. Consider how current scientific ideas might develop in the future – how scientists need to understand the importance of using evidence as proof but with the knowledge that this may change in the future when new evidence comes to light.          This could be discussed in the context of other examples through history, e.g. evolution/fossils, germs and spread of</p>	
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				diseases, DNA and forensic evidence, vaccinations and immunisations (recognise that scientific ideas develop and change over time; identify scientific evidence that has been used to support or refute ideas or arguments)	
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Year 6

<b>Disciplinary Knowledge</b> ( Working scientifically)	<p><b>Planning and Predicting</b></p> <p>Make predictions based on scientific knowledge and understanding</p> <p>Plan different kinds of scientific enquiry to answer questions including recognising and controlling variables where necessary.</p> <p>Suggest methods for testing including fair testing</p> <p>Ensure data collected is appropriate and sufficient</p>	<p><b>Investigating and Observing</b></p> <p>Carry out fair test identifying key factors to be considered ( identifying and controlling variables)</p> <p>Make a variety of relevant observations and measurements using simple apparatus correctly</p> <p>Decide when observations and measurements need to be checked by repeating to give more reliable data</p> <p>Select information from a range of sources</p>	<p><b>Recording, analysing and evaluating</b></p> <p>Communicate findings in tables, bar charts and line graphs while making appropriate use of ICT</p> <p>Identify trends and data in results that do not fit the expected pattern.</p> <p>Provide explanation for differences in observations and measurements</p> <p>Draw conclusions and communicate them in appropriate scientific language</p> <p>Record data and result of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar</p>
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			<p>and line charts ( in line with year 6 maths curriculum)</p> <p>Make practical suggestions how their investigative work could be improved</p> <p>Based on results suggest further questions that could be investigated making predictions where relevant.</p> <p>Identify causal relationships in investigations</p> <p>Begin to research evidence to support or refute ideas/ arguments and begin to separate opinion from fact</p>				
<b>Disciplinary Knowledge</b> ( Second order skills)	<p><b>Significance:</b> Discuss theories of inheritance, evolution and adaptation and key scientists such as Linnaeus and Darwin .Identify scientific evidence that has been used to support or refute ideas or arguments. Understand the importance of nutrition and a healthy lifestyle. Discuss the work of significant scientists</p> <p><b>Written and Oral Expression:</b> Group, classify, describe and explain patterns and use scientific terminology. Use scientific terminology, present and interpret data and explain processes</p> <p><b>Continuity and Change:</b> Describe and evaluate my own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources</p> <p><b>Similarity and Difference:</b> Group and classify based on similarities and difference. Make comparison, find patterns, note differences and draw conclusions</p> <p><b>Cause and Consequence:</b> I can observe processes and link them to scientific ideas</p> <p><b>Responsibility:</b> Work safely and responsibly using a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate</p>						
KEY Concept Vocabulary	inheritance classification Advantage suited Relationship Reliable			KEY Topic Vocabulary	Micro organism Adaptation , Naturalist , Refraction , Voltage, Cell, Resistance Electrons , Physical change , Chemical change , Circulatory system, Blood vessel , Mechanism		
TERM	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	
NC Link	<b>Evolution and Inheritance</b> Recognise	<b>Living things and their habitats</b>	<b>Animals, including humans</b>	<b>Light</b>	<b>Electricity</b>		

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	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	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals; give reasons for classifying plants and animals based on specific characteristics.	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	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	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.
Key Question	<b>Why are fossils scientifically important?</b>	<b>Why is this animal in this group</b>	<b>How does our circulatory system keep us alive?</b>	<b>How does light help us see?</b>	<b>Can a circuit contain more than one component?</b>
Substantive knowledge	<p>Animals evolve over time as they adapt to their environment Evolution happens over a long period of time</p> <p>Offspring are similar but not identical to their parents</p> <p>Offspring inherit characteristics from their parents</p> <p>Offspring can acquire characteristics through life which they will not</p>	<p>Scientists sort and group living things according to their similarities and differences. This is called classification. Scientists who classify living things are called taxonomists.</p> <p>Animals can be put into one of two groups: <b>Vertebrates</b> or <b>Invertebrates</b>.</p>	<p>The circulatory system consists of different systems that work together – heart, lung, veins and arteries</p> <p>Arteries carry oxygenated blood from the heart</p> <p>Veins carry de-oxygenated blood back to the heart</p> <p>The <b>circulatory system</b> carries oxygen, nutrients, and hormones to cells, and removes</p>	<p>Light travels in straight lines</p> <p>Objects are seen because they give off or reflect light</p> <p>Shadows are formed when an object blocks the light</p> <p>Transparent materials allow light to pass through</p>	<p>Metals conduct electricity and allow electrons to flow freely through them</p> <p>Batteries contain chemicals that react together to release electrons</p> <p>Electrons move around a circuit</p> <p>Electrical devices such as bulbs create resistance in a circuit</p> <p>To recognise the symbols in a circuit diagram</p> <p>Changes to a circuit that can be made to make a bulb brighter or dimmer</p>

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	<p>pass on to their off spring</p>	<p>The two groups can be split into further, smaller groups.  <b>Vertebrates can be split into: mammals, birds, fish, reptiles and amphibians.</b>  <b>Invertebrates can be split into: insects, arachnids, annelids, mollusks, crustaceans and echinoderm</b></p> <p>Microorganisms are very tiny living things that can only be seen using a microscope. They can be found in and on our bodies, in the air, in water and on objects around us. Microorganisms are viruses, bacteria, moulds and yeast.</p>	<p>waste products, like carbon dioxide.</p> <p>Exercise is good for the human body and the heart pumps more blood around the body as we exercise</p> <p>Eating a healthy balanced diet is important for humans          Drugs can be both dangerous and life supporting</p>		
<p>Key Learning</p>	<p>Link to prior learning: Y2 animals and offspring; Y3 rocks and fossils; Y2 &amp; Y4 habitats; Y5 reproduction in plants &amp; animals</p> <p>* Vocab: INHERIT Recap on reproduction of plants and animals from Y5 – most plants/animals are a mixture of characteristics from</p>	<p>Link to prior learning: Y1 vertebrate groupings; Y4 classification keys, invertebrate groupings</p> <p>* Revise purpose of classification keys to sort and classify living things according to physical characteristics. Use a prepared classification key to</p>	<p>Link to Y3 skeletal and muscular systems Y4 digestive system; Y1, Y4 classification of animals; Y3 food nutrition* Vocab: SYSTEM Retrieval of knowledge of systems in the body (skeletal, muscular, digestive) – revise main body parts for each system (see curricular detail), their function and purpose.</p> <p>* Briefly explain the purpose of the human</p>	<p>Link to prior learning: Y3 light</p> <p>Revise light sources and that we need light to see.          Vocab: REFLECT Draw diagrams to show light travelling from a light source to our eyes or from a light source reflecting from an object to our eyes.  <b>Key question: Does light travel in straight lines?</b> Fair test – Can</p>	<p><b>Scientist: Thomas Edison (1847 – 1931) – PHYSICIST – applying principles of organised science and teamwork to the process of invention and innovation</b> Link to prior learning: Y4 Electricity</p> <p>* Recap on vocab: CLOSED CIRCUIT OPEN CIRCUIT Build a simple circuit to light bulb. Investigation: (comparative test) - Does it matter how long the wires are? Planning stage to include children recognising and controlling the variables. Set up and complete investigation using a systematic approach. Report and present findings on the causal relationship between the length of wire (resistance) and brightness of bulb. Plan different types of scientific enquiries to answer</p>

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<p>their parents. Explore further through identification of our own inherited physical characteristics and how these are not gender specific. Discuss which characteristics are passed on and which are acquired characteristics.</p> <p>Expand to, for example, dog breeds and crossbreeding (e.g. Labradoodles or Cockapoos)</p> <p>* Vocab: ADAPT Revisit idea of inheritance and changes in offspring over time. Recap work on habitats – research animals or plants specifically suited to extreme environments (e.g. penguins, camels, cactus, and bromelia). Analyse advantages and disadvantages of these adaptations. Be clear about how these adaptations have come about over long periods of time. (present explanations in written forms, such as displays and other presentations)</p> <p>Scientist: Charles Darwin (1858 – 1937) –</p>	<p>sort and identify photos of unfamiliar micro-organisms, insects, molluscs, Annelids, fish, amphibians and mammals only using identifiable characteristics</p> <p><b>. Key Question: Why is this animal in this group?</b> Use the characteristics to establish what the same is and what is different across the groupings. (record data using classification keys; identify scientific evidence to support ideas)</p> <p><b>Are plants classified too?</b> Revise what makes a plant a plant – what characteristics can be considered in plants –root system, flowering – sort plants according to characteristics</p> <p><b>How do we make a classification key?</b> Look at how to create a branching diagram using observable characteristic (</p>	<p>circulatory system. Children to record: What I think the human circulatory system looks like. Use secondary sources to look at models/images of circulatory system.</p> <p><b>Key Question: Why do we need blood in our bodies?</b> Establish that the circulatory system is made up of three separate systems cardiovascular, pulmonary, and systemic). Explore and answer questions to understand the functions of the heart, blood vessels and blood, and how the circulatory system enables the body to function. Create an explanatory diagram of the circulatory system, labelling heart, lungs, arteries, veins, blood. Compare this to their original ideas. (report and present causal relationships and explanations)</p> <p>* Recap on key body parts, function and purpose of human circulatory system. Make explicit links with other known systems – oxygen to muscles allows movement of skeleton;</p>	<p>we see light from a torch through a curved or bent hosepipe? Children make predictions and carry out fair test, then log results and conclusion. (plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary; measure with increasing accuracy and precision; report and present findings from enquiries, including conclusions and causal relationships)</p> <p><b>Key question: How can I see something that is behind me?</b> Children investigate and observe using mirrors and draw diagrams to explain the path and reflection of light rays from light source to object to mirror to our eyes. (present explanations in written forms, such as displays and other presentations)</p> <p>*Why might light look like it is bending – explore refraction –</p>	<p>questions, including recognising and controlling variables where necessary; (measure with increasing accuracy and precision; report and present findings from enquiries, including conclusions and causal relationships)</p> <p>* Show recognised symbols for components in simple circuit diagram: cell, wires, bulb, motor, buzzer, and switch Build a simple circuit to light bulb. <b>Key Question: Can a circuit contain more than one component?</b> Add another component (second bulb, or a buzzer or motor) - what happens? Repeat with further components. Try starting with one buzzer or one motor, then more components. Use recognised symbols to draw diagram of each circuit tested, starting with one component only.</p> <p>Write explanation and why - extra components share the energy therefore dim the light/lower the volume/slow the motor. (plan different types of scientific enquiries to answer questions; report and present findings from enquiries, including conclusions and explanations of causal relationships)</p> <p>* Investigation: (pattern seeking) – How can I make the bulb brighter? Use conclusions of previous enquiries to suggest how to make a single bulb brighter in a simple circuit: increase number of cells, increase voltage, shorten wires (less resistance). Systematically test their ideas to prove/disprove. Test if this also works for maintaining brightness/volume/speed when using multiple components. Conclude relationship between amount of power (input) and brightness/volume/speed (output). (plan different types of scientific enquiries to answer questions; report and present findings from enquiries, including conclusions and explanations of causal relationships)</p>
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	<p>first evolutionary BIOLOGIST * Vocab: EVOLVE. Charles Darwin - revolutionary ideas, observations, evidence - challenging academic, societal cultural and religious norms. Zoom in on Darwin's Finches as a case study for evolution – beaks highly adapted to different food sources – adaptation leading to evolution. (recognise that scientific ideas develop and change over time; identify scientific evidence that has been used to support or refute ideas or arguments)</p> <p>( Pattern seeking) Model advantage of different beaks Pattern seeking KEY QUESTION: How can beak shape help birds eat? Test impact of different shaped “beaks” of ability to grab food. Repeat measurements for accuracy and draw conclusion based on patterns observed. ( repeat measurements, present findings, including conclusions and explanations; identify evidence to</p>	<p>record information on classification key)</p> <p><b>Which living things can we not see?</b> Explore what is meant by a micro-organism or microbe – main types moulds, bacterias and viruses. Research positive and negative microorganisms.</p> <p>What conditions help micro-organism grow? Ask own questions about how we can prevent mould growing on our teacher's bread. List variables involved, write own question to investigate based on variables. Make simple prediction Set up simple investigation and record change in bread over time. Draw conclusions and reflect on prediction ( planning and carrying out fair test; making observations, recording , writing conclusions commenting on accuracy of results)</p>	<p>nutrients from digestive system enables health and growth. (research using secondary sources; report and present findings from enquiries, including conclusions, in oral and written forms) <b>Scientist: Marie M Daly (1921 - 2003) – BIOCHEMIST - developed understanding of how foods and diet affect the heart/circulatory system</b></p> <p>* (Series of lessons) Investigation: (comparison over time/pattern seeking) - Use knowledge of how the circulatory system transports water and nutrients around the body to consider the impact of exercise on the way their bodies function.</p> <p>Complete a daily 5-minute fitness challenge (e.g. laps of the playground) over a two-week period. Measure pre/post pulse rate, count completed laps, record on table. Use results to draw conclusions about the effect of exercise on maintaining a healthy circulatory system. (take measurements with increasing accuracy and precision, including repeat</p>	<p>make observations of examples of refractions</p> <p><b>Key question: Why is a shadow the same shape as the object?</b> Children investigate creating shadows with different objects and a light source and draw a diagram using straight lines to show how shadows are formed. Explore how to lengthen and shorten shadows by changing the position of the torch, but establish that the shadow's shape stays true to that of the object blocking the light because light travels in straight lines (pattern spotting, explanations of casual relationships)</p>	<p>* Recap on input/output findings. Interpret simple circuit diagrams, including some with switches open and closed – position in order of output (brightness/volume) based on input (power). Explain giving reasons</p>
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	<p>support ideas or arguments)</p> <p>* Vocab: FOSSIL Key Question: Why are fossils scientifically important? Explore fossils of plants and animals, ask questions. Can they identify any plants/animals? How do they know? Refer back to Mary Anning's ichthyosaur and how it supported the developing ideas of evolution (year3); fossils as evidence of change and evolution of species over millions of years recognise that scientific ideas develop and change over time; identify scientific evidence that has been used to support or refute ideas or arguments</p>	<p>Explore the Linnaean System of Classification and how this is one way of classifying all known organisms based on physical characteristics. Use the system to demonstrate the similarities between groups of animals (e.g. mammals, or Canada) until further subdivided into order or genus or species. Whole class research into an unfamiliar animal from a different habitat (look back to previous work) and explain where it belongs in the classification system. How is it the same as others of the same genus? How is it different? (careful observation of similarities and differences; identify scientific evidence to support ideas)</p>	<p>readings when appropriate; record data and extrapolate results to form conclusions)</p>		
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