



The **SCIENCE curriculum** demonstrates clear links to the **EYFS Understanding the World early learning goal**. The children's learning in KS1 and KS2 will build on the skills they have developed during their time in the early years: the ability to explore, observe, problem solve, predict, and make decisions about the world around them. The EYFS curriculum gives them opportunities to respond to the natural world and natural phenomena, to talk about what they can see, hear and feel, and to talk about differences and changes they observe, understanding what it means to respect and care for the natural environment and all living things.

Reception	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	C&L With the help of signs and symbols, we will be practising listening to others, so that we can follow instructions and answer simple questions UtW We will learn about the weather and the changes to the environment during the season of Autumn. We will explore and experience the changes during our weekly Forest School sessions and welly walks within the school grounds and our wider community. We will explore and talk about our new school environment.	C&L We will continue to practise our listening skills so that we can follow instructions and answer questions. UtW We will continue to learn about the changes to the weather and the environment during Autumn and we will explore and find out about Winter as the seasons change. We will use the story 'The Tiny Seed' by Eric Carle as a starting point for finding out about plant life cycles. We will plant seeds and bulbs in our outdoor environment and find out what they need to grow. We will predict what will happen to the seeds / bulbs next. We will learn about different materials and will become investigators during our Welly Walks, to find objects and features within our local environment that are made from wood, metal and plastic.	C&L We will continue to practise our listening skills so that we can follow instructions and answer questions. UtW We will continue to learn about the changes to the weather and the environment during Winter. We will explore and experience the changes during our weekly Welly Walks within the school grounds and our wider community. We will monitor and observe the seeds and bulbs we planted last term to check for any changes. We will learn about healthy/unhealthy foods and find out which foods should be eaten freely and in moderation.	C&L We will be able to ask and answer questions to check our understanding and find out more information. This will help us to explore how things work and why things happen, to help us in our problem solving and to organise our thinking. We will be working in small teams to complete a task and will be learning how to tell our peers what we did. UtW We will learn about the changes to the weather and the environment in Spring. We will explore and experience the changes during our weekly Forest School sessions. In our weekly Welly Walks, we will look for signs of new life eg: frogspawn by visiting the local pond within our community. We will observe and record changes to seeds and bulbs planted in the autumn. We will sow summer flowering seeds and monitor their progress.	C&L We will continue to practise our listening skills so that we can follow instructions, answer questions, problem solve and make predictions. We will be working together to tackle a problem, share our ideas, predict what might happen and work to overcome difficulties. UtW We will understand the effect of the changing seasons on the natural world around us. We will continue to observe and record changes to seeds and bulbs planted previously. We will plant herbs and vegetables in our growing area and monitor their progress. In our weekly Welly Walks and Forest School sessions, we will focus on looking for signs of animals and their habitats eg: nests, burrows, ant hills etc. We will also revisit the local pond to check on the frogspawn's progress. We will extend our knowledge of animals from different countries ie: zoo animals and begin to create simple groupings eg: birds, fish, animals with fur.	C&L We will continue to practise our listening skills so that we can follow instructions and answer questions, problem solve, predict, share ideas to reach solutions and explain these to others. UtW We will learn about the changes to the weather and the environment in Summer. We will continue to care for the plants/herbs/vegetables planted previously, identifying features of growth and change over time. We will find out about the life cycle of a plant/animal/insect. During our weekly Welly Walks and Forest School sessions, we will look for different minibeads and find out about where they live and what they like to eat etc. We will use the information we discover to create a bug hotel. We will understand the need to respect and care for the natural environment and all living things. EA&D We will observe and draw insects found on our bug focused Welly Walks

	AUTUMN TERM		SPRING TERM		SUMMER TERM	
YEAR 1	PHYSICS + BIOLOGY	CHEMISTRY	PHYSICS + BIOLOGY	BIOLOGY	BIOLOGY	PHYSICS + BIOLOGY
	* Seasonal changes 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; describe the basic structure of trees	* Everyday materials Distinguish between an object and its material; identify and name everyday materials; describe simple properties of materials and group objects according to these	* Seasonal changes 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	* Animals, including humans 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	* Animals, including humans Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	* Seasonal changes 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; describe the basic structure of a variety of common flowering plants
	Key Question: Is a tree a plant? (<i>observe closely, compare and contrast, describe groupings, explore and answer questions, labelled diagrams</i>) * Identify plants and not plants in school grounds.  Note key features of all plants identified – roots, stem/trunk, leaves. Use these observations to answer the key question. Label a diagram of a tree: leaves, trunk, branches. Key Question: What are plants like in autumn? (<i>observe closely, compare and contrast</i>) * Name the four seasons. Zoom in to autumn: predict signs of autumn that might be seen in the school playground. Go on an autumn walk – were they right? Key Question: What are plants like in autumn? (<i>observe closely, compare and contrast, labelled diagrams</i>) * Zoom in to one evergreen tree and one deciduous tree in the school grounds. What	* Ongoing throughout the year – monthly seasonal observations, as in autumn 1 Link forward - Y2 Everyday Materials Key Question: What is our school made of? (<i>observe, name</i>) * Vocabulary focus: object, material Establish that the material is what an object is made of, and that the same type of object can be made of different materials (eg spoons, plates, bags) * Go into quad; identify, name and label parts of the external school building and the materials they are made of * Recap vocab of object and material. Group everyday objects made from wood, metal, plastic, glass, fabric. (<i>identifying, grouping, classifying</i>) * Recap vocab of object and material. Classify materials based on their properties: wood, metal, plastic, fabric, glass. Key Question: How can we sort these materials?	Link to prior learning from autumn term + link forward to summer term. * Ongoing throughout the year – monthly seasonal observations Key Question: What are plants like in winter? (<i>observe closely, compare and contrast, explore and answer questions</i>) * Recap the four seasons. Zoom in to winter: predict signs of winter that might be seen in the school playground.  Go on a winter walk – were they right? Key Question: Does an evergreen plant change? (<i>observe closely, compare and contrast, keep records of changes over time</i>) * Zoom back in to the two trees from autumn term – name the trees and identify as deciduous and evergreen. Record changes. * Zoom out to look at a range of deciduous and evergreen plants found in	* Ongoing throughout the year – monthly seasonal observations <i>Research using secondary sources</i> (video clips, pictures, teacher knowledge) * Use photos to identify animals and not animals: a few birds, fish, amphibians, reptiles and mammals. Also provide a few examples of plants, rocks and everyday objects (linked back to materials work before Christmas). Children to explain how they know if the photo shows an animal or not. Create a list of common features of all animals (head/eyes/mouth, can move, eats food, reproduces) Show photo of a human – use the features now known to answer the Key Question: Is a human an animal? (<i>use observations to explore and answer questions</i>) * Zoom in to animals: identify and sort pictures into groups using key features: fish, birds, mammals. How do you know this is a fish? How do you know this is a bird? Use these two criteria to then determine the mammals. Tell the children key features of mammals (fur/hair, four limbs, live babies fed with milk). Use all this new information to establish that humans are mammals - Key	* Ongoing throughout the year – monthly seasonal observations Key Question: What are plants like in spring? (<i>observe closely, compare and contrast, explore and answer questions</i>) * Recap the four seasons. Zoom in to spring: predict signs of spring that might be seen in the school playground. Go on a spring walk – were they right?  Link to work in spring term (humans as animals/ mammals/ omnivores). * Recap what they know about humans. Name and label external parts of their body: neck, shoulders, chest elbow, hands, fingers knees, feet, toes * Compare body parts of a human with those of a cat using double-bubble graphic organiser. What is the same? What is different? (<i>observe closely, compare and contrast, explore and answer questions</i>)	* Ongoing throughout the year – monthly seasonal observations Link to prior learning from autumn term and spring term. * Plant a sunflower seed (one for the class, one to take home). Key Question: What will happen to the seed? (<i>explore and answer simple questions</i>) Key Question: What are plants like in summer? (<i>observe closely, compare and contrast, explore and answer questions</i>) * Recap the four seasons. Zoom in to summer: predict signs of summer that might be seen in the school playground.  Go on a summer walk – were they right? * Zoom in to look at plant structure - label: flowers/blossom, petals, stem, leaves, roots, fruit (<i>identify, labelled diagrams</i>) * Return to the two trees in the school grounds and record changes. 

	is the same, what is different? * Start an ongoing working display across the year – ONCE A MONTH record date, weather, temperature, changes in these two trees, and the (approximate) time it goes dark. Note clocks moving back in October and nights drawing in. (observe and talk about changes, make tables/charts/displays)	(make sure the sorting criteria are binary: for example hard/soft, rough/smooth, flexible/rigid, transparent/opaque) – use vocab appropriate to cohort. Record using stem sentences and properties of materials with missing words: eg Wood is _____ and _____ (identifying, grouping, classifying)	the school grounds – name some of the trees and plants and group pictures into evergreen or deciduous (observe closely, identifying and grouping, describe groupings)	Question: What kind of animal is a human? (identifying, grouping, classifying, use observations to compare and contrast, explore and answer questions) * Zoom in to animals: repeat structure of previous lesson to identify and sort pictures of amphibians and reptiles using key features – frog, toad, newt, snake, lizard, turtle, crocodile (smooth/rough skin/scales, legs/no legs, water/land/both) (identifying, grouping, classifying, use observations to compare and contrast) * Animals need food to survive – they either eat plants, or animals, or both. Classify and sort known animals from previous sort into herbivore, carnivore, omnivore. Key Question: Humans - herbivore, carnivore or omnivore? (identifying, grouping, classifying)	* Vocab: SENSES Identify and name the five senses.  Zoom in on sound, smell, taste – children to experience selection of each. Record by showing preferences (draw or write). (compare and contrast) Link forward to Y3 sight/light * Recap on five senses. Zoom in on touch and sight. - Use feely bags to explore textures. Can they identify objects just from feeling them? - Have a range of optical illusions/very detailed pictures. What do you see/notice/ wonder? * Concluding lesson: Which do you think is the most important sense? Why? Draw/write to justify their ideas. (compare and contrast, use observations to ask and answer questions)	(observe closely, compare and contrast, keep records of changes over time) Link forward – Y2 What plants need to grow * Over the half term, observe and record changes to their class sunflower seed. Key Question: What has happened to the seed? Refer back to their predictions – were they right? (use observations to answer questions)
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	AUTUMN TERM		SPRING TERM		SUMMER TERM	
YEAR 2	CHEMISTRY	BIOLOGY	BIOLOGY	BIOLOGY	BIOLOGY	BIOLOGY
	* Uses of everyday materials 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.	* Plants 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.	* Plants 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.	* Living things and their habitats 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.	* Living things and their habitats 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.	* Animals, including humans 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 types of food, and hygiene.
	Recap discussion - Link to prior learning – Everyday Materials (Y1) * Recap materials and the difference between a material and an object. Identify objects in the classroom and their materials. Discuss why objects are made of those materials (table – wood and metal, window – glass, school jumper – fabric) * Selection of same object (plates, cups, spoons) made from different materials (eg paper, plastic, ceramic). Identify and name the properties of each material. Key Question: Which do you think is the best material for a (plate/cup/spoon)? Why? Record using photos/giving reasons. (<i>observe, compare, record observations</i>) * Key Question: How can we change the shape of different materials?	Link to prior learning: Y1 summer term * Recap on parts of a plant from Year 1 curriculum. Key Question for this half term's work: What do plants need to grow and stay healthy? Take ideas/predictions/suggestions from children. * Recap on planting sunflowers at end of Y1. Show bean seed. Investigation: (<i>fair test</i>) – Planning Does a plant need water to grow?  * Vocab – GERMINATE Investigation: (<i>fair test</i>) – Results  (what happened) and Conclusion (answering the question – how do you know?) Development question: What will happen if I keep / stop watering the one that has germinated? (<i>raise and answer questions, perform simple tests to</i>)	Link to prior learning before Christmas. * Initial results of observation over time – evidence of germination but slower in colder temps (<i>perform simple tests to explore and answer questions</i>)  * Investigation: (<i>fair test, observations over time</i>) – Planning  Does a plant need light to germinate? (Pg 197 Essential Primary Science, A. Cross) Cress seeds to be planted and left in the light (windowsill) and in the dark (inside a cupboard). * Investigation (<i>fair test, observations over time</i>) - 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	Link to prior learning: plants, seasonal changes * 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, eg wooden bench, cooked chicken (<i>classifying and sorting, raising and answering questions, record using charts</i>)  * Link back to last lesson and things that are living. Zoom in on living things in our school playground -animals and plants. Key Question: How do we know it is alive? Discuss using what they know about conditions for growth/health of plants and what they know about themselves as animals staying alive/healthy plus pets/knowledge of other living things. Begin to create a list of factors that determine if something is alive (eat food, move/grow, reproduce)	Link to prior learning from previous term + link forward to Y4 Habitats * Recap 'habitat' and what living things need to survive. Zoom back in on the local habitat of the playground and link back to Y1 work by exploring the school garden/grounds/forest and identifying microhabitats within it (eg a decomposing log, or one particular tree). Identify and name animals found in any of the school's microhabitats and record these (drawing/photos) Back in class, introduce the term 'invertebrate'. Classify any animals found into vertebrates/invertebrates. (<i>observe, identify, classify</i>)  * Zoom in on habitat of our school forest and make comparisons with rainforest habitat – What is the same? What is different? (<i>observe, compare and contrast</i>) * Link back to Y1 to recap key vocabulary: herbivore, carnivore, omnivore Use familiar examples, including humans, to build	Link to prior learning: Y1 animal classification, including humans. * Picture sort – match adult animals to young: human/baby, frog/tadpole, cat/kitten, butterfly/caterpillar, fly/maggot, crocodile/hatchling, shark/pup, swan/cygnnet. Key Question: Do all baby animals look like their parent? (<i>observe, ask and answer questions</i>)  * Focus on life cycle of a chicken. Key Question: Is it only birds that lay eggs? Take a whole-class poll – yes or no to key question. Children then further explore ONE (not all) of the following life cycles: a moth, a frog or a crocodile. Use their new knowledge to answer the question. * Recap on what habitats provide for living things and secure understanding of the four basic needs for survival: food, water, air, shelter. Zoom

	Provide children with a range of objects of different materials, including examples of thick and thin, for example thick cardboard/piece of paper; felt tip pen/freezer bag; saucepan/piece of foil. Also provide everyday inflexible objects made of wood/stone. In groups, children explore how to change the shape of each object/material. 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. <i>(observe, compare, ask questions, use observations to answer questions)</i>	<i>explore and answer questions)</i> Link forward - Y3 Labelling parts of flowering plant * Continue to observe growth/changes after germination – conclude with a detailed labelled drawing at the end of the term of the bean plant: stem, leaf, roots <i>(closely observe, draw labelled diagrams)</i> * Investigation: <i>(fair test, observations over time)</i> – Does a plant need warmth to germinate?  plant two bulbs of flowering plants (eg daffodil) one indoors, one outdoors; draw/write a prediction for each bulb <i>(perform simple tests to explore and answer questions)</i>	the dark are paler/leggier/less healthy (sunlight provides food/energy for leafy plants, therefore healthier in the light) <i>(raise and answer questions, perform simple tests to explore and answer questions)</i> * Final results of observation over time (warmth) – further growth of bulb, evidence of bud/flowers when kept in the warm.  - Pull together all learning from these three investigations - overall conclusion for effects of water, light and temperature on growth and health of plants. <i>(raise and answer questions, perform simple tests to explore and answer questions)</i>	<i>(exploring questions, using observation to answer questions)</i> Link forward – Y4 Habitats * Vocab: HABITAT 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 everything a living thing needs to survive – food, water, shelter, (temperature) <u>Whole class activity:</u> match selection of animals and plants to 5 global habitats  (Atlantic Ocean, Sahara Desert, Macclesfield Forest, Arctic tundra, Buffalo Gap Grassland (USA). Locate these habitats on the world map. <i>(identify, classify, group, describe groupings)</i>	simple food chains, referring to herbivores, carnivores and omnivores. Use this activity to secure understanding of how animals obtain their food from plants and other animals in their habitat, as well as introducing the idea of dependency within habitats for survival (extinction or disappearance of one species can affect others).	into humans. Key Question: What do humans need to stay healthy? Lesson on food groups and balanced diet. * Zoom into humans. 5-minute workout - identify how it makes them feel. Establish recommended exercise per day. Key Question: How can I keep myself healthy? Support the children to discuss/explore their food choices/snacks, how active they are, their sleep patterns – link to PSHE healthy lifestyles and goal setting. <i>(gather and present data and information in tables)</i>
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	AUTUMN TERM		SPRING TERM	SUMMER TERM	
YEAR 3	PHYSICS	PHYSICS	CHEMISTRY	BIOLOGY	BIOLOGY
	* Light Recognise that they need light in order to see things, and that dark is the absence of light; notice that light is reflected from surfaces; recognise that light from the sun can be dangerous and that there are ways to protect their eyes; recognise that shadows are formed when the light from a light source is blocked by an opaque object; find patterns in the way that the size of shadows change	* Forces and Magnets Compare how things move on different surfaces; notice that some forces need contact between two objects, but magnetic forces can act at a distance; observe how magnets attract or repel each other and attract some materials and not others; compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials; describe magnets as having two poles; predict whether two magnets will attract or repel each other, depending on which poles are facing.	* Rocks and Soils 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.	* Flowering plants 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 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.	* Animals, including humans Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat; identify that humans and some other animals have skeletons and muscles for support, protection and movement.
	Link to prior learning – Y1 senses – sight Link forward – Y6 Light * Sorting light sources and not light sources  Some objects appear to be light sources but instead reflect the light from other sources e.g. moon, bike reflectors. (classifying) * Key question: can we see in the dark?  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. (recording findings using simple scientific language, drawings, labelled diagrams) * Investigation: (comparative test) - Which material reflects light the best?  Set up investigation and record results and conclusion.	Scientist: Sir Isaac Newton (1642 – 1727) - PHYSICIST – established the three laws of motion * 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)  * Key question: Does a magnet have to touch the object to attract it? Investigate magnetism of different objects through a piece of paper/card, through the table, from various distances. Establish magnetism as a non-contact force. * Observe that magnets will attract some objects. Use magnets to find and group materials that are magnetic. Key question: 	Scientist: James Hutton (1797 – 1875) – GEOLOGIST – known as the ‘Father of Modern Geology’. * Bridge back to Y2 materials and link to geography. Where can we find rock in our school grounds? Explain that there are natural AND man-made rocks, and that there are three different types of natural rock which are formed in different ways. VOCAB: igneous, sedimentary, metamorphic * TMA – ROCK SAMPLES - Name rock samples and sort into sedimentary, igneous and metamorphic based on their appearance. Draw/label a simple diagram to show the rock cycle. (identifying differences, similarities or changes related to simple scientific ideas and processes)  * Key question: Which rock is the hardest? Devise a simple test to classify rocks by their hardness. Look for patterns when drawing conclusions e.g. metamorphic rocks are harder. (recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables) Link forward to Y6 – Mary Anning + Evolution * Observe a range of fossils (TMA resource) Research, using secondary sources, how fossils are formed and 	Link to prior learning - Y2 parts of plant/conditions for healthy growth * Recap names of parts of a flowering plant (link to Y1 sunflower and Y2 bean plant). Explore and discuss the idea that every part has a job to do: leaf (food), root (nutrition and support), stem (support), flower (reproduction). Revise conditions for healthy growth from Y2 (air, light, water, warmth) and development (nutrients from soil, and room to grow). Record using detailed labelled diagram, including functions. (careful observations, discuss relationship between structure and function) * Zoom in on flowers - explore life cycle of	Link to prior learning – Y2 what humans need to be healthy. * Recap on living things – sort photos of familiar and unfamiliar living things 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 Key Question: Which food do you think contains the most.....? (fat, sugar, salt, fibre etc) (use research to ask and answer questions) * Recap what constitutes a healthy, balanced diet for humans. Zoom in on nutritional values of different supermarket produce using food labels. Children predict the foods they think will have high fat/sugar/salt content. Check packaging – were there any surprises? How will this affect their own food choices?

	(include if time but not necessary for end points) * Key question: what are shadows? Investigate shadows using torches and a range of opaque and transparent objects. Observe differences. Draw a diagram to explain how shadows are formed. (<i>careful observations</i>) Learn not to look at the sun directly and how to protect our eyes.	Which materials are magnetic? Include some metal objects that are NOT magnetic to establish that it is iron content, not metal, that makes an object magnetic (<i>gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</i>) * 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 (<i>using straightforward scientific evidence to answer questions or to support their findings</i>)	establish a link between most fossils and sedimentary rocks (<i>careful observation, use research to ask and answer questions</i>) * Key question: what is soil? 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.  * Key question: which is the most absorbent soil? 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. (<i>recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</i>) 	flowering plants and the part flowers play - pollination, seed formation, seed dispersal. * Investigation: comparative test: How does water travel around a plant?   Complete carnation or celery/food colouring investigation (<i>explore questions, observe over time, use observations to answer questions</i>)	* Group pics of animals - with a skeleton / without a skeleton. Vocab: SKULL, SPINE, RIBS, PELVIS. Match skeletons to animals.  (<i>careful observations; identify differences/ similarities; identify, group and classify</i>) * Observe the effect of a skeleton on support (spine), protection (skull, ribs) and movement (pelvis). Address misconceptions eg slug/snake, exoskeletons etc Use their new knowledge to answer the question: What would happen if humans didn't have a skeleton? (<i>careful observations; explore ideas</i>) Key Question: Why do we need muscles? (<i>careful observations; identify differences/ similarities</i>) * Explain the purpose of muscles for movement and maintaining body positions, including the heart (internal).
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	AUTUMN TERM		SPRING TERM		SUMMER TERM	
YEAR 4	BIOLOGY	CHEMISTRY	BIOLOGY	PHYSICS	PHYSICS	BIOLOGY
	* Living things and their habitats Recognise that living things can be grouped in a variety of ways; explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment; recognise that environments can change and that this can sometimes pose dangers to living things.	* States of matter Compare and group materials together, according to whether they are solids, liquids or gases; observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C); identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	* Living things and their habitats Recognise that living things can be grouped in a variety of ways; explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment; recognise that environments can change and that this can sometimes pose dangers to living things.	* Electricity Identify common appliances that run on electricity; construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers; identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery; recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit; recognise some common conductors and insulators, and associate metals with being good conductors.	* Sound Identify how sounds are made, associating some of them with something vibrating; recognise that vibrations from sounds travel through a medium to the ear; find patterns between the pitch of a sound and features of the object that produced it; find patterns between the volume of a sound and the strength of the vibrations that produced it; recognise that sounds get fainter as the distance from the sound source increases.	* Animals, including humans Describe the simple functions of the basic parts of the digestive system in humans; identify the different types of teeth in humans and their simple functions; construct and interpret a variety of food chains, identifying producers, predators and prey.
	Link to prior learning - Y1 classification; Y2 identify/ name plants and animals in local environment Link forward – Y6 Classification Scientist: Carl Linnaeus (1707 – 1778) – BOTANIST AND ZOOLOGIST – formalised the modern system of naming organisms * Recap on vocab from prior learning: HABITAT, VERTEBRATES, INVERTEBRATES * Provide a selection of photos of living things. Sort into five known vertebrate groups, invertebrates, flowering plants, grasses, non-flowering plants. * Talk through/model how to use a classification key using one or two photos from last lesson and YES/NO questions. Then create a classification key as a whole class with children coming up with yes/no questions to identify another living thing. Evaluate the effectiveness of their questions at each point. Can the children work in small groups to complete their own classification key for one plant/animal?	Link to prior learning – Y1, Y2 materials * Sort a selection of materials using new vocab: solids, liquids, gases.  <i>Could include sugar (and/or salt/flour) + water in different forms as a solid/liquid/gas for further discussion.</i> * Understand how particles behave in solids, liquids, gases- watch videos/draw diagrams/role play particles moving -add to working wall * Explore the changing states of water when heated and cooled: Vocab – EVAPORATE/EVAPORATION, CONDENSE/CONDENSATION Draw detailed diagrams explaining how behaviour of particles changes when a substance is heated/cooled. <i>(give oral and written explanations)</i> * Demonstrate how to use a thermometer (THERM – Greek – ‘heat’). Look at different pictures of thermometers showing icy	Link to prior learning: Y2 food chains; flowering plants; habitats and basic needs for survival * Revise ‘invertebrates’ and ‘habitat’ from prior learning. Show photos of birds found in school grounds – wood pigeon, magpie, crow, sparrow, jay, jackdaw. Research, discuss and name the birds, where they live, what they eat. Record: <i>Why the school grounds are a good habitat for birds.</i> * Think about previous lesson and what local birds eat. Children use simple food chain model to answer key question: Do we need invertebrates? explaining the impact of removing invertebrates from the food chain. <i>(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)</i>	Scientist: Alessandro Volta (1745 - 1827) – ITALIAN CHEMIST & PHYSICIST – pioneer of electricity and power – construction of the first battery. * Explain electricity as a source of energy. Identify everyday appliances that run on electricity. Categorise further into mains/battery, including devices that can be recharged. 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 Name/picture-match basic electrical components: cell/battery, wire, bulb, buzzer, motor TMA RESOURCE - Provide all components and challenge them to answer the Key Question: How can I make the bulb light up? Identify what worked across each group to establish idea of a complete loop. Children draw circuit; say why it worked. Picture predictions for four open/ closed circuits, giving reasons.	Link to prior learning – Y1 body parts associated with senses. Key Question: How do we hear sounds? * Children draw/write: How I think we hear sounds. Children play/listen to variety of instruments. Discuss preferences, pitch, volume. Feel/see vibrations as instruments are hit/ blown/plucked. Vibrations (sound waves) = energy. Vary volume and link to strength of vibrations – louder sound = more energy <i>(ask questions and make careful observations to answer them; report findings, including causal explanations)</i> * Key Question: Can I make an instrument to play sounds of a different pitch? Children start by exploring pitch (speed of vibrations) using same objects but of different sizes (eg varying sized metal saucepan lids, rulers on table at different lengths, elastic bands of different thicknesses, different water levels in bottles – teacher could use tray of water/tuning fork/ripples, show under visualiser). Children use a range of junk modelling equipment to create an instrument of their choice (stringed, drum, shaker etc) – can they vary the pitch of the sound created?	Link to prior learning – Y1 herbivores, carnivores, omnivores; Y2 food chains; Y3 food nutrition * Recap on herbivore, carnivore, omnivore + simple food chains. Introduce terms ‘producer’, ‘prey’, ‘predator’. Construct own simple food chains. <i>(record using simple scientific language, drawings, labelled diagrams)</i> * Zoom in on teeth. Show teeth from herbivores, carnivores, and omnivores including humans. Children speculate on functions of teeth, suggesting reasons for differences by exploring the question: What animal would have this tooth? Why? Label jaws of different animals, including human - identify types of teeth and their function dependent on herbivore/ carnivore/omnivore. <i>(compare, suggest reasons for differences)</i> Link forward – Y6 will recap of all human systems Vocab: DIGEST Explain the term ‘digestive system’. Children to draw: ‘What I think the digestive system looks like.’ Secondary sources - models/images of digestive system - ask questions

	<i>(gather, record, classify and present data in a variety of ways to help in answering questions)</i> * Go into school grounds – what invertebrates can we find? Take photos/name these. Whole class classification key to identify 3 or 4 different invertebrates- what questions could we ask? * Zoom in on birds. Key Question: What bird is this? Provide children with a selection of bird photos (showing whole body), some local some not, but none named at this point: wood pigeon, magpie, kingfisher, barn owl, secretary bird, ostrich. 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. Add labels to their classification key as each bird is identified. <i>(raise and answer questions; classify and present data in a variety of ways to help in answering questions)</i> If time, explain which birds are native to the UK and which aren't, then which can be found in the school grounds... School – wood pigeon, magpie UK – wood pigeon, magpie, kingfisher, barn owl Not native – secretary bird, ostrich	water, tap water, hot water, boiling water - recap on particles of water in each state. * Key Question: Why does it rain? Observe water evaporating and condensing (eg kettle boiling/steam on window); recap on particles/state of matter. Recap from Y3 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 of the water cycle. <i>(record using simple scientific language, drawings, labelled diagrams)</i>	Vocab: ENVIRONMENT * Key Question: How can I improve my local environment? Recap on negative impact of one factor changing in habitat (invertebrates removed from food chain - last lesson). Emphasise that, unlike humans, plants and animals cannot easily relocate to new habitats if there is a negative change. Children generate questions to explore examples of natural changes (eg seasonal, flood, fire, earthquakes) and human changes (both positive and negative). Children explore, discuss and suggest ways to support habitats, explaining why their suggestion is positive and will help local wildlife. <i>(give oral and written explanations for cause and effect)</i> * If time- Raise and answer questions about a local environmental issue- Danes Moss – looking at the argument from both sides and weighing up evidence and impact, both positive and negative.	<i>(ask relevant questions and use different types of scientific enquiries to answer them)</i> Vocab: CONDUCTOR, INSULATOR * Investigation: <i>(comparative test)</i> – Can I make a bulb light up without using wire? Planning – Children to suggest a range of everyday objects/materials for testing. Make predictions. <i>(ask relevant questions; set up simple comparative tests)</i> Testing - Test using range of everyday objects made from different materials. 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. <i>(make systematic and careful observations; gather, record and present data using simple scientific language and tables; report on findings, including oral and written explanations and conclusions)</i> * 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). <i>(use straightforward scientific evidence to support their findings and extrapolate their ideas)</i>	<i>(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)</i> * Use secondary sources to explain that sound waves (energy) travel through particles to the ear and to explore how sounds get fainter the further you move away from them. Present their findings in different ways.	to understand functions of main parts: mouth, tongue, teeth, oesophagus, stomach, small and large intestine, rectum, anus. Draw/label detailed diagram. <i>(draw and discuss ideas, explore questions, record using scientific language and labelled diagrams)</i> * Retrieval of main parts of digestive system. Practical demonstration of function of these parts (TMA session?) Children to record (write/draw) explanation for each step using scientific vocab. <i>(careful observations, oral and written explanations)</i>
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	AUTUMN TERM		SPRING TERM		SUMMER TERM	
YEAR 5	CHEMISTRY	PHYSICS	PHYSICS	BIOLOGY	BIOLOGY	BIOLOGY
	* Properties and changes of materials 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.	* Forces Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object; identify the effects of air resistance, water resistance and friction, that act between moving surfaces; recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	* Earth and Space Describe the movement of the Earth, and other planets, relative to the Sun in the solar system; 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.	* Living things and their habitats 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	* Living things and their habitats 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	* Animals, including humans Describe the changes as humans develop to old age, including changes at puberty
	Link to prior learning – Y1, Y2 materials; Y4 states of matter * Recap – establish difference between object, material, property. Provide selection of everyday objects of various materials, including those that are transparent, reflective, and conduct 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/what might happen if a different material was chosen for that purpose. * Recap on properties of materials and states of matter/particles – ensure children recognise liquids and gases as materials, as well as solids.  Investigation: (<i>changes over time</i>) – 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, observe/record evaporation of water over time 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: DISSOLVE, SOLUTION	Link to Y3 forces – what is a force? <i>Push/pull – start, stop, change shape, change direction</i>. Demonstrate balanced and unbalanced forces through pushes and pulls. Scientist: Albert Einstein (1879 – 1955) – PHYSICIST – developed the Theory of Relativity – the theory of gravity as a warping of space around an object – the more massive the object, the more it warps the space around it. Vocab: Gravity Key question: The heavier the object, the faster it falls.  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. (<i>close observations, identify evidence to support ideas or arguments, pattern seeking</i>)  TEACHER'S NOTE – this statement is not correct:	Link to prior learning: Y1 seasonal changes/varying day length * Draw/label: My ideas about the Sun, Earth and Moon – encourage them to show a sense of size, movement, anything else they know. Vocab: STAR PLANET ORBIT Key Question: Why 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.  * Key Question: If it's daytime in England, is it also daytime in Australia? 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 world at the same time. (<i>report and present explanations in oral and written forms, identifying scientific evidence to support ideas or arguments</i>)  * Vocab: SATELLITE	Scientists: David Attenborough (1926 -) Jane Goodall (1934 -) Steve Backshall (1973 -) <i>All have studied nature as it exists in the natural world; particular interest in conservation and environmental responsibility</i> Link to Y2 life cycles; Y3 flowering plants; Y4 habitats * Recap on characteristics of living things - zoom in on REPRODUCTION. Explain sexual reproduction involving two parents/egg and sperm. Revise characteristics of mammals. Investigation: (<i>pattern seeking</i>) – Do all mammals have the same life cycle? 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) (<i>identify evidence to support ideas or arguments</i>) * Recap on mammalian life cycles; discuss other familiar life cycles – chicken (bird), frog (amphibian),	* Recap work completed on animal life cycles before Easter – link this to spring/early summer – chicks, lambs, frogspawn, more insects around – why might this be? Use similarities and differences between the life cycles of mammals, birds, amphibians and insects to conclude that all include birth, growth, reproduction, death. (<i>observe and compare similarities and differences; ask questions and suggest reasons</i>) * Revise reproduction and life cycles. Zoom in on plant reproduction - sexual reproduction - recap parts of flowering plant and their role in plant reproduction. Look at different types of seeds. Begin to understand the processes of pollination and seed dispersal, and know that new plants will be genetically different from the parent plant and from each other because of mixing male gametes (pollen grains) with female gametes (ovules)	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, from birth, through growth and reproduction, to death. Zoom in on humans to create an information timeline indicating developmental stages: infant, toddler, child, adolescent, adult, late adulthood * (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.

	<i>(present findings, including conclusions and explanations; identify evidence to support ideas or arguments)</i> * 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.  <i>(plan different types of scientific enquiries to answer questions; report and present findings from enquiries, including explanations)</i> * 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. <i>(present findings, including conclusions and explanations; identify evidence to support ideas or arguments)</i>	<i>because gravity is a constant force, all objects fall at the same rate. The weight of an object will not affect the speed at which it falls.</i> Introduce the terms air resistance/water resistance and how these slow objects down. Link to  previous lesson. Key question: How can we make the best parachute? Possible variables to explore and discuss – material used, size of parachute, shape of parachute, height of drop, <i>(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)</i> Research simple mechanisms  involving pulleys (flagpoles, window blinds), levers (scissors, opening paint can, see saw) and gears (bikes). 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. <i>(present findings from enquiries)</i>	Zoom in on the Moon. List things that orbit the Earth. Establish moons as satellites of planets. The Moon's orbit of the Earth interacts with the Earth's orbit of the Sun. Key Question: Why does the moon seem to change shape? Use models and secondary sources to demonstrate the elliptical orbit of the moon.  Address misconceptions, such as - Moon is a light source, being able to see 'all' of the Moon, 'there is more than one moon'. Create detailed, labelled diagram of phases of the Moon. * Discuss the importance of evidence in scientific study and when presenting scientific theories and ideas. Discuss the evidence available to the early ASTRONOMERS: Aristotle and Ptolemy's geocentric view compared with Copernicus and Galileo's heliocentric ideas. Key Questions: Has the Earth ever been flat? 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, eg evolution/fossils, germs and spread of diseases, DNA and forensic evidence, vaccinations and immunisations <i>(recognise that scientific ideas develop and change over time; identify scientific evidence that has been used to support or refute ideas or arguments)</i>	butterfly/moth (insect) – sexual reproduction. Vocab: METAMORPHOSIS In groups, research the life cycles of other examples of birds and amphibians to establish rules: bird – 4 stages: egg, hatchling/young, fledgeling/juvenile, adult amphibian – 4 stages: egg, tadpole/larvae, young, adult (including metamorphosis) <i>(identify evidence to support ideas or arguments)</i> * Revise life cycle of butterfly/moth – 4 stages: egg, larva (caterpillar), pupa (chrysalis or cocoon), adult – sexual reproduction. Link to amphibians - metamorphosis.  Investigation: <i>(pattern seeking)</i> - Do all insects go through a metamorphosis? 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). <i>(present findings, including conclusions and explanations; identify evidence to support ideas or arguments)</i>	* Vocab: ASEXUAL Do all plants grow from seeds? Explore  asexual plant reproduction using research and examples of tubers, runners, plants and bulbs. Be clear this is asexual reproduction/ cloning/no mixing of male and female gametes. Make predictions about what will happen in each instance. Either plant examples of these to observe over coming weeks, or watch time lapse videos to see growth of new 'cloned' plant. <i>(Record data using scientific diagrams, labels, tables; present findings from enquiries, including conclusions, in oral and written forms)</i> * 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)	
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	AUTUMN TERM		SPRING TERM		SUMMER TERM
YEAR 6	BIOLOGY	PHYSICS	BIOLOGY	PHYSICS	BIOLOGY
	* Living things and their habitats Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals; give reasons for classifying plants and animals based on specific characteristics.	* Light Recognise that light appears to travel in straight lines; use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye; explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes: use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	* Evolution and Inheritance Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago; recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents; identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	* Electricity 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.	* Animals, including humans 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
	Link to prior learning: Y1 vertebrate groupings; Y4 classification keys, invertebrate groupings; Y5 describe the life process of reproduction in some plants and animals, and the differences in life cycles of living things. * Revise the known groupings for classification based on common characteristics, using correct terminology: <i>plants</i> – flowering, non-flowering; <i>animals</i> – <u>vertebrates</u> (fish; amphibians; reptiles; birds; and mammals) and <u>invertebrates</u> – (name some eg insects, arachnids, molluscs, but not expected to know all) * Revise purpose of classification keys to sort and classify living things according to physical characteristics. Use a prepared classification key to sort and identify two or three photos of <u>unfamiliar</u> insects, molluscs, arachnids, fish, amphibians, mammals only using identifiable characteristics. Key Question: Why is this animal in this group? (it has fur/feathers/is hatching from an egg/has no legs and is swimming underwater etc) (<i>record data using classification keys; identify</i>  	Link to prior learning: Y3 light Revise light sources and that we need light to see. Vocab: REFLECT, EMIT 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. Key question: Does light travel in straight lines? Fair test – Can 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. (<i>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</i>) 	Link to prior learning: Y2 animals and offspring; Y3 rocks and fossils; Y2 & Y4 habitats; Y5 reproduction in plants & animals; Y6 autumn term Linnaean System of Classification * Vocab: INHERIT Recap on reproduction of plants and animals from Y5 – most plants/animals are a mixture of characteristics from their parents. Explore further through identification of our own inherited physical characteristics and how these are not gender specific. Expand to, for example, dog breeds and crossbreeding (eg Labradoodles or Cockerpoos) <i>Scientists:</i> James Watson – MOLECULAR BIOLOGIST AND GENETICIST (1928 -) Francis Crick MOLECULAR BIOLOGIST AND GENETICIST (1916 – 2004) Rosalind Franklin CHEMIST (1920 – 1958) <i>All contributed to the discovery of the structure of DNA</i> * Vocab: ADAPT	Link to prior learning: Y4 Electricity * Recap on vocab: CLOSED CIRCUIT OPEN CIRCUIT * Show recognised symbols for components in simple circuit diagram: cell, wires, bulb, motor, buzzer, switch Build a simple circuit to light bulb. Key Question: Can a circuit contain more than one component? 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. Write explanation and why - extra components share the energy therefore dim the light/lower the volume/slow the motor. (<i>plan different types of scientific enquiries to answer questions; report and present findings from enquiries, including conclusions and explanations of causal relationships</i>) * Investigation: How can I make the bulb brighter? Use conclusions of previous enquiry 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 	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 previous curricular detail), their function and purpose. * Briefly explain the purpose of the human 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. Establish that the circulatory system is made up of the heart, blood vessels and blood. 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. (<i>report and present causal relationships and explanations</i>)  

<i>scientific evidence to support ideas)</i> * Introduce new classification groups: microorganisms and fungi and explain that these don't fit into the more common classification groupings.  Revise known scientist, Carl Linnaeus, from Y4 – BRIEFLY explain/explore the importance of the Linnaean System of Classification and how this is one way of classifying all known organisms based on physical characteristics. Use dichotomous key system to sort living things (plants and animals) into known classification groups. How is each living thing the same as others in this group? How is it different? <i>(careful observation of similarities and differences; record findings using classification keys; identify scientific evidence to support ideas)</i> <i>Scientist: Mary Anning (1799 – 1847) – PALAEONTOLOGIST</i> Show photos of Mary's 1811 fossil discovery – explore Victorian perspective using concept cartoon.  Use identifiable features from the skeleton to determine which vertebrate they think it is. Show/tell that the ichthyosaur was eventually determined to be a reptile. Recognise difficulty of classification in 1811 when no previous examples of this animal had ever been seen. <i>(recognise that scientific ideas develop and change over time; identify scientific evidence that has been used to support or refute ideas or arguments; reporting and presenting findings, in oral and written forms)</i>	Key question: How can I see something that is behind me? 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. <i>(present explanations in written forms, such as displays and other presentations)</i> Key question: Why is a shadow the same shape as the object?  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 <i>(pattern spotting, explanations of causal relationships)</i>	Revisit idea of inheritance and changes in offspring over time. Recap work on habitats – research animals or plants specifically suited to extreme environments (eg penguins, camels, cactus, bromelia). Analyse advantages and disadvantages of these adaptations. Be clear about how these adaptations have come about over long periods of time – explain that this is through chance, not choice. <i>(present explanations in written forms, such as displays and other presentations)</i> <i>Scientist: Charles Darwin (1858 – 1937) – first evolutionary BIOLOGIST</i> * Vocab: EVOLVE Remind children of Mary Anning from autumn term, and the changes in scientific evidence over time that proved the existence of ichthyosaurs. 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; fossils as evidence of change and evolution of species over millions of years.  <i>(recognise that scientific ideas develop and change over time; identify scientific evidence that has been used to support or refute ideas or arguments)</i>	when using multiple components. Conclude relationship between amount of power (input) and brightness/volume/speed (output). <i>(plan different types of scientific enquiries to answer questions; report and present findings from enquiries, including conclusions and explanations of causal relationships)</i> * Reason about input/output when interpreting simple circuit diagrams, including some with switches open and closed to determine whether or not the components will work/how loud/bright/fast they will be. Justify their answers using their prior knowledge.	* 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; nutrients from digestive system enables health and growth. <i>(research using secondary sources; report and present findings from enquiries, including conclusions, in oral and written forms)</i>  * (Series of lessons) Investigation: <i>(comparison over time/pattern seeking)</i> - 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. Complete a daily 5-minute fitness challenge (eg 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.  <i>(take measurements with increasing accuracy and precision, including repeat readings when appropriate; record data and extrapolate results to form conclusions)</i> (TMA lesson – heart dissection)
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