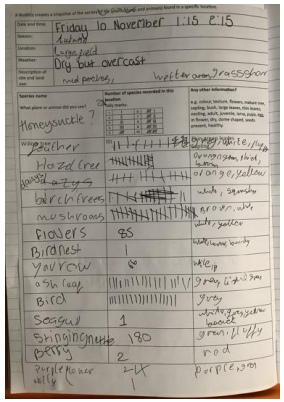
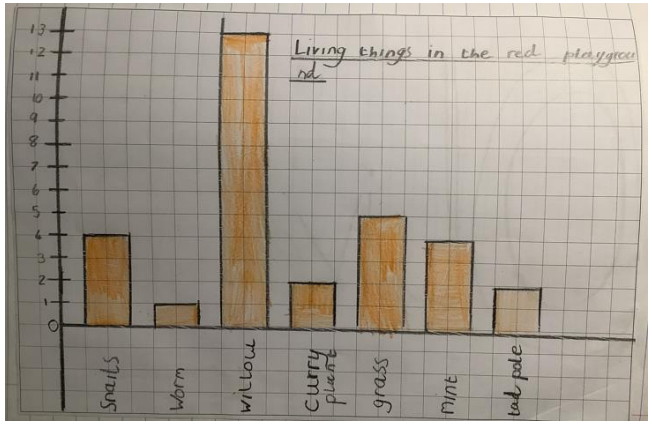
Hope Kindness Forgiveness Aspiration Love Courage Trust Respect Friendship

Drake Primary School and Little Pirates

Year 4 Science Curriculum Overview 2023-2024

<table>
<tr><th>Term</th><th>Autumn
(14 weeks)</th><th>Spring
(12 weeks)</th><th>Summer
(12 weeks)</th></tr>
<tr><td>Longitudinal Study: BioBlitz</td><td colspan="3">A BioBlitz creates a snapshot of the variety of life (plants, fungi & animals) found in a specific location.
Count the plants, animals and fungi that are in Sophia's Garden. Draw a bar chart of the results. Repeat every term.
Drake > CURRICULUM DEV > Science > 2024/25> BioBlitz
 
  </td></tr>
<tr><td>Theme</td><td>Folk
  </td><td>Compare
  </td><td>Us
  </td></tr>
<tr><td>Science focus</td><td>Biology: Living things and their habitats</td><td colspan="2">Chemistry: States of matter
Physics: Electricity</td><td>Physics: Sound</td><td>Biology: Animals, including humans</td></tr>
<tr><td>Science National Curriculum</td><td>Biology: Living things and their habitats
● Recognise that living things can be grouped in a variety of ways.</td><td colspan="2">Physics: Electricity
● Identify common appliances that run on electricity.</td><td colspan="2">Physics: Sound
● Identify how sounds are made, associating some of them with something vibrating.</td></tr>
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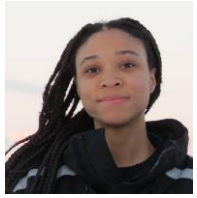
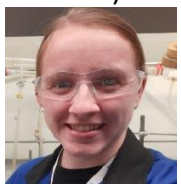
	● Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. ● Recognise that environments can change and that this can sometimes pose dangers to living things. **Chemistry: States of matter** ● Compare and group materials together, 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.	● 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. ● To know about precautions for working safely with electricity.	● 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. **Biology: 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.
Key concepts	**Living things and their habitats** Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e.	**Electricity** Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.	**Sound** A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A

	negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year. **States of matter** A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling.		sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds. **Animals, including humans** Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing). Living things can be classified as producers, predators and prey according to their place in the food chain.

	Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.		
Common misconceptions	**Living things and their habitats** Some children may think: • the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain • there is always plenty of food for wild animals • animals are only land-living creatures • animals and plants can adapt to their habitats, however they change • all changes to habitats are negative. **States of matter** Some children may think: • 'solid' is another word for hard or opaque • solids are hard and cannot break or change shape easily and are often in one piece • substances made of very small particles like sugar or sand cannot be solids • particles in liquids are further apart than in solids and they take up more space • when air is pumped into balloons, they become lighter • water in different forms – steam, water, ice – are all different substances	**Electricity** Some children may think: • electricity flows to bulbs, not through them • electricity flows out of both ends of a battery • electricity works by simply coming out of one end of a battery into the component.	**Sound** Pitch and volume are frequently confused, as both can be described as high or low. Some children may think: • sound is only heard by the listener • sound only travels in one direction from the source • sound can't travel through solids and liquids • high sounds are load and low sounds are quiet. **Animals, including humans** Some children may think: • arrows in a food chains mean 'eats' • the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain • there is always plenty of food for wild animals • your stomach is where your belly button is • food is digested only in the stomach • when you have a meal, your food goes down one tube and your drink down another • the food you eat becomes "poo" and the drink becomes "wee".

	• all liquids boil at the same temperature as water (100 degrees) • melting, as a change of state, is the same as dissolving • steam is visible water vapour (only the condensing water droplets can be seen) • clouds are made of water vapour or steam • the substance on windows etc. is condensation rather than water • the changing states of water (illustrated by the water cycle) are irreversible • evaporating or boiling water makes it vanish • evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material.		
Possible activities	**Living things and their habitats** • Observe plants and animals in different habitats throughout the year. • Compare and contrast the living things observed. • Use classification keys to name unknown living things. • Classify living things found in different habitats based on their features. • Create a simple identification key based on observable features. • Use fieldwork to explore human impact on the local environment e.g. litter, tree planting. • Use secondary sources to find out about how environments may naturally change. • Use secondary sources to find out about human impact, both positive and negative, on environments. **States of matter**	**Electricity** •Construct a range of circuits. • Explore which materials can be used instead of wires to make a circuit. • Classify the materials that were suitable/not suitable for wires. • Explore how to connect a range of different switches and investigate how they function in different ways. • Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm. • Apply their knowledge of conductors and insulators to design and make different types of switch. • Make circuits that can be controlled as part of a DT project.	**Sound** •Classify sound sources. •Explore making sounds with a range of objects, such as musical instruments and other household objects. • Explore how string telephones or ear gongs work. • Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks. • Measure sounds over different distances. • Measure sounds through different insulation materials. **Animals, including humans** • Research the function of the parts of the digestive system. • Create a model of the digestive system using household objects.

	• Observe closely and classify a range of solids. Observe closely and classify a range of liquids. • Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind. • Classify materials according to whether they are solids, liquids and gases. • Observe a range of materials melting e.g. ice, chocolate, butter. • Investigate how to melt ice more quickly. • Observe the changes when making rocky road cakes or ice-cream. • Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate. • Explore freezing different liquids e.g. tomato ketchup, oil, shampoo. • Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration). • Observe water evaporating and condensing e.g. on cups of icy water and hot water. • Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers. • Use secondary sources to find out about the water cycle.		• Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing). • Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls. • Use food chains to identify producers, predators and prey within a habitat. • Use secondary sources to identify animals in a habitat and find out what they eat.

Scientists https://pstt.org.uk/unique-resources/a-scientist-just-like-me/	**Living things and their habitats** Brianna Green (African American Biogeochemist)  **States of matter** Dr Kirsty Anderson (Scottish Medicinal Chemist) 	**Electricity** Nicole Melzack (British battery researcher) 	**Sound** Gailileo Galilei - Frequency and Pitch of Sound Waves (Italian astronomer)  **Animals, including humans** Marie Maynard Daly- first black woman with a PhD in chemistry. Looked at how nutrients are digested. (American biochemist) 
Arts enrichment opportunities	**Living things and their habitats** Draw classification key **States of matter** Representation of the molecules in a solid, liquid and a gas	**Electricity** Electron art (subatomic particle) Circuit drawing (representation)	**Sound** Rainbow sound waves Rice on a drum Sprinkles with a tuning fork **Animals, including humans** Intestine lining drawing- villi
Books you could use **https://www.stem.org.uk/teaching-science-through-stories**	**The Vanishing Rainforest (Richard Platt)-** is a good book for looking at the human impact on the environment, in particular deforestation. **Charlie and the chocolate factory (Roald Dahl)-** provides a good context to learn about states of matter.	**How does a lighthouse work? (Roman Belyaev)** Facts about lighthouses and how they work.	**Horrid Henry Rocks (Francesca Simon)** - is a great book to start teaching about sound and exploring how sounds are made. **The little mole who knew it was none of his business (Werner Holzwarth)-** This funny tale creates a great setting through which children can explore simple functions of the basic parts of the digestive system in humans. **Wolves (Emily Gravett)-** Wolves is a brilliant setting for constructing and interpreting a

			variety of food chains, as well as identifying producers, predators and prey.
Trips / Visitors / Experiences	Walk to Fredericks Wood- links to habitats/ human impact on environment	Melting point of different types of chocolate	Frederick's wood walk to look at food chains Dentist nurse to talk about teeth? Digestive system model
LKS2 Working Scientifically National Curriculum	•Asking relevant questions using different types of scientific enquiries to answer them. •Setting up simple practical enquiries, comparative and fair tests. •Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. •Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. •Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables •Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. •Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. •Identifying differences, similarities or changes related to simple scientific ideas and processes. •Using straightforward scientific evidence to answer questions or to support their findings.		
Enquiry suggestions	**Living things and their habitats** **Comparative / fair testing** How does the average temperature of the pond water change in each season? Does the amount of light affect how many woodlice move around? **Research** Why are people cutting down the rainforests and what effect does that have? **Observation over time** How does the variety of invertebrates on the school field change over the year? **Pattern Seeking** How has the use of insecticides affected bee populations? **Identifying, grouping and classifying**	**Electricity** **Comparative / fair testing** Which metal is the best conductor of electricity? How does the thickness of a conducting material affect how bright the lamp is? **Research** How does a light bulb work? How has electricity changed the way we live? **Observation over time** How long does a battery light a torch for? **Pattern Seeking** Which room has the most electrical sockets in a house? **Identifying, grouping and classifying** How would you group these electrical devices based on where the electricity comes from?	**Sound** **Comparative / fair testing** Which material is best to use for muffling sound in ear defenders? Are two ears better than one? How does the volume of a drum change as you move further away from it? How does the length of a guitar string/tuning fork affect the pitch of the sound? **Research** Do all animals have the same hearing range? **Observation over time** When is our classroom the quietest? **Pattern Seeking** Is there a link between how loud it is in school and the time of day? If there is a

	Can we use the classification keys to identify all the animals that we caught pond dipping? **States of matter** **Comparative / fair testing** Does seawater evaporate quicker than fresh water? How does the surface area of a container of water affect how long it takes to evaporate? How does the mass of a block of ice affect how long it takes to melt? **Research** What are hurricanes, and why do they happen? **Observation over time** Which material is best for keeping our hot chocolate warm? How does the level of water in a glass change when left on the windowsill? How does the mass of an ice cube change over time? **Pattern Seeking** Is there a pattern in how long it takes different sized ice lollies to melt? **Identifying, grouping and classifying** Can you group these materials and objects into solids, liquids, and gases? How would you sort these objects/materials based on their temperature?		pattern, is it the same in every area of the school? **Scientific Discovery** How has science helped people who are deaf? What did Gailileo Galilei find out about sound? **Animals, including humans** **Comparative / fair testing** In our class, are omnivores taller than vegetarians? **Research** How do dentists fix broken teeth? **Observation over time** How does an egg shell change when it is left in cola? **Pattern Seeking** Are foods that are high in energy always high in sugar? **Identifying, grouping and classifying** How can we organise teeth into groups? What are the names for all the organs involved in the digestive system? **Scientific Discovery** How has a visit to the dentist changed since ancient times? Who is Marie Maynard Daly? **over time** How long does a battery light a torch for? **Pattern Seeking** Which room has the most electrical sockets in a house? **Identifying, grouping and classifying**

			How would you group these electrical devices based on where the electricity comes from?
A.R.E. / skills progression (possible evidence)	**Living things and their habitats** • Can name living things living in a range of habitats, giving the key features that helped them to identify them • Can give examples of how an environment may change both naturally and due to human impact • Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.) • Can use classification keys to identify unknown plants and animals • Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter **States of matter** • Can create a concept map, including arrows linking the key vocabulary • Can name properties of solids, liquids and gases • Can give everyday examples of melting and freezing • Can give everyday examples of evaporation and condensation • Can describe the water cycle • Can give reasons to justify why something is a solid liquid or gas • Can give examples of things that melt/freeze and how their melting points vary	**Electricity** • Can name the components in a circuit • Can make electric circuits • Can control a circuit using a switch • Can name some metals that are conductors • Can name materials that are insulators • Can communicate structures of circuits using drawings which show how the components are connected • Use classification evidence to identify that metals are good conductors and non-metals are insulators • Can incorporate a switch into a circuit to turn it on and off • Can connect a range of different switches identifying the parts that are insulators and conductors • Can add a circuit with a switch to a DT project and can demonstrate how it works • Can give reasons for choice of materials for making different parts of a switch • Can describe how their switch works	**Sound** • Can name sound sources and state that sounds are produced by the vibration of the object • Can state that sounds travel through different mediums such as air, water, metal • Can give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it • Can give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder • Can give examples to demonstrate that sounds get fainter as the distance from the sound source increases • Can explain what happens when you strike a drum or pluck a string and use a diagram to show how sounds travel from an object to the ear • Can demonstrate how to increase or decrease pitch and volume using musical instruments or other objects • Can use data to identify patterns in pitch and volume • Can explain how loudness can be reduced by moving further from the sound source or by using a sound insulating medium **Animals, including humans** • Can sequence the main parts of the digestive system • Can draw the main parts of the digestive system onto a human outline

	• From their observations, can give the melting points of some materials • Using their data, can explain what affects how quickly a solid melts • Can measure temperatures using a thermometer • Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup • From their data, can explain how to speed up or slow down evaporation • Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet			• Can describe what happens in each part of the digestive system • Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for • Can name producers, predators and prey within a habitat • Can construct food chains Can use diagrams or a model to describe the journey of food through the body explaining what happens in each part • Can record the teeth in their mouth (make a dental record) • Can explain the role of the different types of teeth • Can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores • Can create food chains based on research	
Prior knowledge check **Concept questions** Drake > CURRICULUM DEV > Science > 2024/25> Concept questions **Flashback questions** Drake > CURRICULUM DEV	**Concept Questions- Habitats / classification:** 1st lesson of the unit: Concept questions- evidence in books. **Flashback Questions:** Every lesson- begin with 3 flashback questions- evidence in books.	**Concept Questions- States of matter:** 1st lesson of the unit: Concept questions- evidence in books. **Flashback Questions:** Every lesson- begin with 3 flashback questions- evidence in books.	**Concept Questions- Electricity:** 1st lesson of the unit: Concept questions- evidence in books. **Flashback Questions:** Every lesson- begin with 3 flashback questions- evidence in books.	**Concept Questions- Sound:** 1st lesson of the unit: Concept questions- evidence in books. **Flashback Questions:** Every lesson- begin with 3 flashback questions- evidence in books.	**Concept Questions- Animals:** 1st lesson of the unit: Concept questions- evidence in books. **Flashback Questions:** Every lesson- begin with 3 flashback questions- evidence in books.

> Science > 2024/25> Flashback questions					
Assessment	Autumn mid-term Summative assessment: Head start Progress test A		Spring mid-term Summative assessment: Head start Progress test B		Summer mid-term Summative assessment: Head start Progress test C

	Folk	Compare	Us
			
YEAR 4 **Vocabulary**	**Working Scientifically:** Develop, enquiry, practical, enquiry, fair test, comparative, test, relationships, conclusion, accurate, thermometer, data logger, estimate, data, diagram, key (identifying), table, chart, bar chart, results, predictions, explanation, reason, similarity, difference, question, evidence, information, findings, criteria, values, properties, characteristics, questioning, observation, improvements, process **Living things and their habitats:** environment, non-flowering plants, ferns, mosses, flowering plants, grasses, vertebrate animals: fish, birds, mammals, amphibians, reptiles	**Working Scientifically:** Develop, enquiry, practical, enquiry, fair test, comparative, test, relationships, conclusion, accurate, thermometer, data logger, estimate, data, diagram, key (identifying), table, chart, bar chart, results, predictions, explanation, reason, similarity, difference, question, evidence, information, findings, criteria, values, properties, characteristics, questioning, observation, improvements, process **Electricity:** electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection,	**Working Scientifically:** Develop, enquiry, practical, enquiry, fair test, comparative, test, relationships, conclusion, accurate, thermometer, data logger, estimate, data, diagram, key (identifying), table, chart, bar chart, results, predictions, explanation, reason, similarity, difference, question, evidence, information, findings, criteria, values, properties, characteristics, questioning, observation, improvements, process **Sound:** sound, vibration, vibrate, ear, ear drum, pitch, volume, insulation, sound wave, tuning fork

	invertebrate animals: snails, worms, slugs, spiders, insects human impact: litter, deforestation, population increases, nature reserves, danger, ecological, positive, negative, classification, classification keys, environment, habitat, migrate, hibernate **States of matter:** solid, liquid, gas, state, temperature, heat (heating), cool (cooling), water cycle, evaporation, condensation, melting, melting point, boiling point, freezing, degrees Celsius (°C)	short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol N.B. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.	**Animals, including humans:** digestive system, digestion, mouth, tongue, saliva, teeth, oesophagus, stomach, small intestine, large intestine, nutrients, rectum, anus types of teeth: molar, premolar, incisor, canine saliva, enamel, dentine, acid food chain: prey, predator, primary producer, carnivore, omnivore, herbivore, predator
Sentence Stems	**Knowledge:** understand that… I wonder if… The picture reminds me of… The most important idea is… An example of…is… I already know that… A type of…is… A…is different from a …because… …is the same as…because they both… …and …both have The science term that describes…is… The word I am thinking of is like… **Working scientifically:** First, I need to find out… I saw…which made me think… I think this was caused by… It would be easier if… How would I be able to check…? I predict that…because… I think…because…		

	This happened because… I will test my prediction by… I have reached the conclusion that… My observations show that… There is a pattern…It shows that… …was caused by…