

Year	Topic	Topic	Topic	Topic	Topic
1	Plants (Identifying Plants)	Seasonal changes	Animals, including humans (Identifying Animals)	Everyday materials	
2	Plants (Growing Plants)	Living things and their habitats (Living in Habitats)	Animals, including humans (Growth and Survival)	Uses of everyday materials (Exploring Everyday Materials)	
3	Plants (How Plants Grow)	Light (Light and Shadow)	Animals, including humans (Health and Movement)	Rocks (Rocks, Fossils and Soils)	Forces and magnets
4	Sound	Living things and their habitats (Living in Environments)	Animals, including humans (Eating and Digestion)	States of matter	Electricity (Circuits and Conductors)
5	Earth and space	Living things and their habitats (Life Cycles curriculum links to Sex Ed/RSE)	Animals, including humans (Changes and Reproduction)	Properties and changes of materials	Forces (Forces in Action)
6	Evolution and inheritance	Living things and their habitats (Classifying Organisms)	Animals, including humans (Healthy Bodies)	Light (Seeing Light)	Electricity (Changing Circuits)

Progression in Working Scientifically;

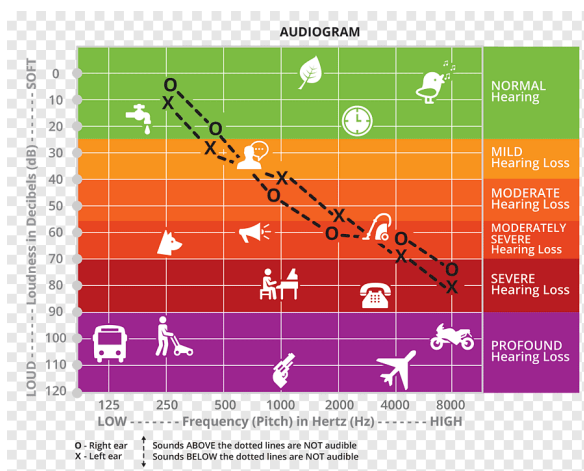
Lower KS2 (for pupils working towards Year 3 and 4 Curriculum):	Check list
Asking relevant questions and using different types of scientific enquires to answer them.	
Setting up simple practical enquiries, comparative and fair tests.	
Making systematic and careful observations and, where appropriate, 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.	



Year 4 – Sound

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 3 and 4)
	Key Learning:	Key Question(s):
- Know how sound is made associating some of them with vibrating. - Know what happens to a sound as it travels from its source to our ears. - Know the correlation between the volume of a sound and the strength of the vibrations that produced it. - Know how sound travels from a source to our ears. - Know the correlation between pitch and the object producing a sound. I can describe and explain sound sources. I can explain how different sounds travel. I can recognise sounds can travel through vibrations from medium to the ear. I can find patterns between the volume of a sound and the strength of vibrations that it produces in my music lessons. I can recognise that sounds get fainter as the distance from the sound source increases.	Children must know and understand that: - Sound travels from its source in all directions and we hear it when it travels to our ears. - Sound travel can be blocked. - Sound spreads out as it travels. - Changing the shape, size and material of an object will change the sound it produces. - Sound is produced when an object vibrates. - Sound moves through all materials by making them vibrate. - Changing the way an object vibrates changes it's sound. - Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds. - Faster vibrations (higher frequencies) produce higher pitched sounds	- How can you change the volume of a sound? - How does the size of an ear trumpet affect the volume of sound detected? - How does the type of material affect how well it blocks a sound? - How does thickness of material affect how well it blocks a sound? - Which materials vibrate better and produce louder sounds? Can we identify any patterns? - Which materials make the best string telephone components? (tin cans, paper cups, plastic cups, wire, cable, string, plastic or elastic – predict and test) - How does length of the tube (when making a straw oboe) affect the pitch and volume? - Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water?
	Using and Applying knowledge: - Classify sound sources. - If possible, explore making different sounds using musical instruments. - If possible, measure sounds over distances. - If possible, measure sounds through different insulation materials. - Sounds can travel through solids and liquids e.g. under water, scuba divers can hear sounds.	PLAN Resources for Assessment (via Canvas): - Progression in working scientifically skills Year 3&4 - Working scientifically skills Year 3&4 - PLAN Primary Science – Supporting Assessment (Sound Year 4 – Hamza)

- Look at audiogram and develop a basic understanding of how it works.
- Compare your audiogram (hearing loss) to your peers.

**Prior Learning****In KS1 Children should:**

- May have some understanding that objects make different sounds.
- Some understanding that they use their ears to hear sounds.
- Know about their different senses.

Misconceptions:

- 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 loud and low sounds are quiet.

In KS3 Children will:

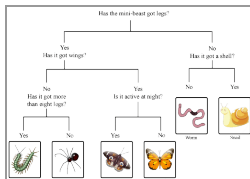
- frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound
- sound needs a medium to travel, the speed of sound in air, in water, in solids
- sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal
- auditory range of humans and animals.

Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]:

Amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave.

Teaching Ideas (examples) – Year 3 & 4 Working Scientifically

Ask questions	Observing closely	Performing test	Identifying & classifying	Gathering & recording data	Using observation to suggest answers to questions
Are two ears better than one? Are two hearing-aids/CI better than one?	Ruth (Music Lesson) use different drums and observe; How does the volume of a drum change as you move further away from it? Does the width/size of a drum effect the sounds of the drum?	Not necessary, but an optional – in one of Ruth’s music lessons, pupils to identify different frequencies and volume from different musical instruments.		Do all animals have the same hearing range?	Look at your audiogram and compare it with your peers.



Year 4 – Living things and their habitats (Living in environments)

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 3 and 4)
- 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 danger to living things. I can group living things by their characteristics/features. I can explain the differences between vertebrates and invertebrates. I can create a classification key. I can use classification keys to identify, classify and group living things. I can use a key to identify invertebrates. I can describe how changes in the environment can impact on the endangered species. I can present my findings in writing and in BSL.	Key Learning: Children must know and understand that: - Living things can be grouped based on their characteristics - Environmental changes can affect different habitats in different ways - Different organisms are affected in different ways by the environmental changes - Different food chains occur in different habitats - Human activity significantly affects the environment e.g. Palm Oil	Key Question(s): - What food chains and webs are there in our local habitat? - How does energy move through the food chain? - If you remove one species from an environment, what will be the impact? On others? - How does environmental change affect different organisms? - What are the most important things we could do to improve our outside area? (pond, compost, wildflowers)
	Using and Applying knowledge: - Observe plants and animals in different habitats (if possible throughout the year) - Compare and contrast living things observed - Use classification keys to name living things - Classify living things found in different habitats based on their features/characteristics - Create a classification key based on the living things you have studied e.g. specific habitat, specific animals, plants etc.	PLAN Resources for Assessment (via Canvas): - Progression in working scientifically skills Year 3&4 - Working scientifically skills Year 3&4 - PLAN Primary Science – Supporting Assessment (Living things and their habitats Year 4 - Chaya)
Prior Learning	Misconceptions:	

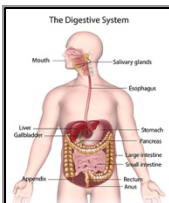
In Year 2 Children should: • I can identify and classify objects that are living and non-living. • I can compare which plants and animals are living and non-living. • I can explain what habitat means and give examples. • I can identify, name plants and animals in their habitats. • I can describe how animals get their food (from plants and other animals). • I can create a simple food chain. I can explain how living things (animals and plants) in a habitat depend on each other.	• The death of one of the parts of food chain or web has no consequence on the rest of the chain. • There is always plenty of food for wild animals. • Animals are only land-living creatures/organisms • Animals and plants can adapt to their habitats, however they change • All changes to habitats are negative.	<i>In Year 5 children will (Animals, Including Humans):</i> • 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. <i>In Year 6 children will (Living things & their Habitats):</i> • Classify living things into broad groups according to observable characteristics and based on similarities and differences. • Give reasons for classifying plants and animals based on specific characteristics.
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Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]:

Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation.

Teaching Ideas (examples) – Year 3 & 4 Working Scientifically

Ask questions	Observing closely	Performing test	Identifying & classifying	Gathering & recording data	Using observation to suggest answers to questions
What will happen to the animals if we drain/cover up the pond?	Observe plants and animals in different habitats (if possible throughout the year).	Visit a pond in Kings Cross and identify all animals.	Can we use the classification keys to identify all the animals that we caught by pond dipping (Kings Cross)?	Gather information on the number of specific animals found in the pond and record these. Create a simple bar chart.	Why are people cutting down the rainforests and what effect does that have?



Year 4 – Animals, including humans (Eating and Digestion)

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 3 and 4)
	Key Learning:	Key Question(s):
- Describe the simple functions of the basic parts of the digestive system in humans. - Identify the different types of teeth in humans and their functions. - Construct and interpret a variety of food chains, identifying producers, predators and prey. - I can draw and label the main parts of the human digestive system (focus on mouth, oesophagus, stomach, liver, small/large intestines and rectum). - I can explain the functions of the digestive system. - I can explain the basic function for each part of the digestive system (e.g. stomach breaks down food, liver cleans blood, etc). - I can identify and label different types of teeth. - I can identify and explain the function of each type of teeth. - I can do a scientific enquiry on tooth decay. - I can create a simple food chain containing one producer and two consumers.	Children must know and understand that: - Food is broken down by the teeth and further in the stomach and intestines, where nutrients go into the blood. - The blood carries nutrients (and oxygen) around the body. - Animals/humans have teeth to help them eat. - Different types of teeth do different jobs. - Nutrients produced by plants move to primary consumers then to secondary consumers through food chains.	- What different types of food are there? - Why do we need a variety of foods? - Do all organisms eat the same things? - Why do some people need different diets? (weightlifter vs marathon runner) - Why are teeth important? - What happens to our food when we eat? - What do our digestive system look like? - How does our food turn into stools and urine?
	Using and Applying knowledge: - Research the function/s for each part of the digestive system. - Draw a simple diagram of the digestive system starting from the mouth to the rectum. - Create a model of the digestive system using objects. - Explore and identify which teeth are used for cutting, tearing and grinding. - Classify herbivores, carnivores and omnivores according to the type of teeth they have. - Identify producers and consumers.	PLAN Resources for Assessment (via Canvas): - Progression in working scientifically skills Year 3&4 - Working scientifically skills Year 3&4 - PLAN Primary Science – Supporting Assessment (Animals including humans Year 4 - Hadia)

• I can identify the producer and consumer (predator and prey) in food chains. • I can create a food web of plants and animals we find in a forest.	• Use food chains to identify producers, predators and prey in a habitat e.g. forest (grass, worms, vole, rabbit, birds, fox, owl, deer etc).	
Prior Learning	Misconceptions:	
In Year 3 Children should: • Describe/explain how humans and animals get their food and drink. • Describe/explain that humans and animals need the right food and drink to survive (right type of nutrients). • Identify that humans and animals need skeletons. • Describe what happens if animals and humans do not have skeletons. • Identify and label bones on human skeletons. • Compare and label a human and an animal skeleton. • Identify and describe three different types of skeletons. • Identify and explain the 3 main functions of a skeleton (to support, protect and move). • Identify and label bones that protect the human body. • Identify and label bones that support the human body. • Identify and label bones that help the human body to move. • Describe/explain why we need muscles.	Misconceptions: • The death of one part of a food chain or web has no impact or consequence on the rest of the chain • There is always plenty of food for wild animals • Your belly button is where your stomach is! • Food is only digested in the stomach • When you eat food, your food goes down in one tube and your drink (liquid) goes down in another tube • The food you eat is your stools (“poo”) and the drink becomes urine (“wee”)	<i>In Year 5 Children will:</i> • Know the life cycles of different living things, e.g. Mammals, amphibians, insects and birds. • Know the differences between different life cycles. • Know the process of reproduction in plants. • Know the process of reproduction in animals

- Set up a simple practical experiment to show how muscles work.
Record their findings.

Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]:

Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, liver, tooth, canine, incisor, molar, premolar, producer, consumer.

Teaching Ideas (examples) – Year 3 & 4 Working Scientifically

Ask questions	Observing closely	Performing test	Identifying & classifying	Do practical enquiry, comparative and fair tests Gathering & recording data	Using observation to suggest answers to questions
What do our bodies do with food we eat?	Observe how coke (which is very acid) can clean dirty coins.	Demonstrate how food is broken down in our stomachs (use coke to represent stomach acid).	What are the names of all the organs involved in the digestive system? Can you organise it in its working order?	Put one egg (representing a tooth) in a jar of coke and one in a jar of water. Record, gather information and share your findings with your class.	Why it is important to have stomach acid in our stomach? What happens if we don't have stomach acid?



Year 4 – States of matter

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Compare and group materials together, according to solids, liquids and gases. - Observe materials changing states when heated or cooled, and measure the temperature at which this happens in degrees Celsius. - Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. I can describe and sort materials into solids, liquids and gases. I can investigate solids and explain their properties. I can investigate liquid and explain their properties. I can investigate gases and explain their properties. I can investigate changing materials when they are heated or cooled, and share my findings using scientific vocabulary. I can explore how water changes state. I can investigate how water evaporates. I can identify and describe the different stages of the water cycle.	Children must know and understand that: - Solids, liquids and gases are described by observable properties. - Materials can be divided into solids, liquids and gases. - Heating causes solids to melt into liquids and liquids evaporate into gases. - Cooling causes gases to condense into liquids and liquids freeze into solids. - The temperature at which given substances change states are always the same.	- How does the amount of water added to flour affect its state? - How does the amount of detergent added to water affect how slippery it is? - How does the temperature affect how viscous a liquid is (use cooking oil)? - Place a peach in a glass of lemonade and watch it spin. Why does it behave that way and can you prove it? - How does the material sprinkled on ice and snow affect how quickly it melts? - What chocolate would be best to smuggle? How does the type of chocolate affect its melting temperature? - What is the melting temperature of ice and how does it compare with the freezing temperature of water? - Is the melting temperature of wax the same as its freezing temperature?

	Using and Applying knowledge: • Observe closely a range of solids and liquids • Explore how to make gases visible e.g. squeezing sponges under water to see bubbles, or showing the effect e.g. using straws to blow objects • Classify materials according to their properties e.g. solids, liquids and gases • Investigate how to melt ice quickly • Observe the changes when making ice-cream (FT lesson?) • Observe how water can turn into solid and gases e.g. freeze, boil • Use thermometer to measure temperatures e.g. ice water, boiling water(demonstration only), tap water	PLAN Resources for Assessment (via Canvas): • Progression in working scientifically skills Year 5&6 • Working scientifically skills Year 5&6 • PLAN Primary Science – Supporting Assessment (States of Matter Year 4 - Chaya)
Prior Learning	Misconceptions:	
In Year 4 Children should: • Compare different rocks. • Group rocks based on their properties. • Explain how fossils are formed by dead matters trapped between rocks. • Recognise that soils are made from rocks and organic materials. • Do an investigation to find out what soil is made of and present their findings using scientific vocabulary.	• 'Solid' is another word for hard or opaque object • Solids are hard and cannot break or change shape easily and are often in one piece • Substances made of very small particles like sand cannot be solids • When air is pumped into balloons, they become lighter • Water in different forms – steam, water, ice – are all different substances • Melting, as a change of state, is the same as dissolving • Steam is visible water vapour (only the condensing water droplets can be seen e.g. on the mirror or glass after having a shower or bath) • Clouds are made of water vapour or steam	<i>In Year 5 children will :</i> • Compare and group everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including by filtering, sieving and evaporating. • Give reasons based on evidence from comparative and fair tests, for particular uses of everyday materials, including wood, metals and plastic. • Demonstrate that dissolving, mixing and changes of states are reversible changes.

	- The substance on windows etc. is condensation rather than water - The changing states of water e.g. water cycle, are irreversible - Evaporating or boiling water makes it disappear - Evaporation is when the sun 'sucks' (BSL) up the water, or when water is absorbed into surface/material	Explain that some changes result in the formation of new materials, and this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda.
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Vocabulary [TA to create a key list of vocabulary, add sign graphics AND pictures next to each word]:

Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection

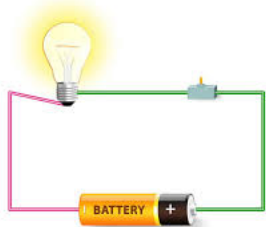
Teaching Ideas (examples) – Year 3 & 4 Working Scientifically

Ask questions	Observing closely	Performing test	Identifying & classifying	Do practical enquiry, comparative and fair tests Gathering & recording data	Using observation to suggest answers to questions
Does the mass of a block of ice affect the length of time it takes to melt?	Which material is best for keeping chocolate warm?	To investigate the melting of chocolate – put three chocolates in a tin foil and put in three cups (one with cold water, one with warm water and the third with hot boiling water (observation only)). Put thermometer in each cup and record.	Can you group objects / materials into solids, liquids and gases?	Do the 'test' to check which conditions helps the chocolate to melt quickly. Fair test – equal size/weight of chocolate in a tin foil. Put thermometer in each cup and observe. Do not touch. Teacher to check the melting of the chocolate and share it with the class. Class to record data e.g. temperature, timing and results.	Why do we get rain and hailstones?



Year 4 – Electricity (Circuits and Conductors)

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 3 and 4)
	Key Learning:	Key Question(s):
- Identify common appliances that run on electricity. - Construct a simple electrical circuit, identifying and naming its' basic parts e.g. cells, wires, bulbs, switches and buzzers. - Identify whether or not a lamp will light in a simple circuit, with or without a battery. - Recognise that a switch opens and closes the circuit and associate this with whether or not a lamp lights in a simple circuit. - Recognise some common conductors and insulators, and associate metals with being good conductors. - Know the differences between a conductor and an insulator; giving examples of each. - Know safety when using electricity. I can describe what electricity is and give examples.	Children must know and understand that: - A source of electricity (mains or battery) is needed for electrical devices to work. - Electrical sources push electricity around a circuit. - More batteries will push the electricity around the circuit faster. - Devices work harder when more electricity goes through them. - A complete circuit is needed for the electricity to flow and devices to work. - Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.	- What would life be like without electricity? How did people manage in the past without electricity? Look at photos/videos/role-play. - What sort of things use/need electricity? What can we do without these? - What electrical devices do I use? - In which ways can we 'get' electricity? (mains/plugs/batteries/wireless) - How do we make electricity? Look at simple drawings/pictures. - How do batteries work? Look at simple drawings/pictures. - How quickly can batteries run out? Does this make a difference depending on number of components? - How does the number of batteries added to the circuit affect a device? - Which materials can/can't carry electricity? (conductors/insulators)
	Using and Applying knowledge:	PLAN Resources for Assessment (via Canvas):

• I can identify and name common electrical appliances and the type of electricity they use (mains/battery, etc) • I can construct a simple electrical circuit, and name the parts e.g. cells, wires, bulbs, switches and buzzers. • I can explain how a switch works and why circuits need it. • I can recognise that a switch opens and closes a circuit. • I can identify, name and sort materials into conductors and insulators. • I can recognise some common conductors and insulators, and associate metals as good conductors. • I can demonstrate how to use electrical appliances safely.	• Construct a simple circuit. • Explore which materials can be used instead of wires to make a circuit. • Classify materials that are suitable/not suitable as substitutes for wires. • Explore how to connect a circuit using a range of different switches and investigate how they function in different ways. • Choose switches for circuits to solve problems e.g. a pressure switch for a burglar alarm. • Make a circuit that can be controlled as part of a D&T project (application). SIMPLE ELECTRIC CIRCUIT 	• Progression in working scientifically skills Year 3&4 • Working scientifically skills Year 3&4 • PLAN Primary Science – Supporting Assessment (Electricity Year 3 – Douglas)
Prior Learning In EYFS Children should: • <i>have some understanding that objects need electricity to work.</i> • <i>understand that a switch will turn something on or off.</i>	Misconceptions: • Electricity flows to bulbs, not through them. • Electricity flows out of both ends of battery. • Electricity works by simply coming out of one end of a battery into the component.	<i>In Year 6 Children will:</i> • Make a link between 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.
Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]: Electricity, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component.		

Teaching Ideas (examples) – Year 3 & 4 Working Scientifically

Ask questions	Observing closely	Performing test	Identifying & classifying	Gathering & recording data	Using observation to suggest answers to questions
Research Thomas Edison and give reasons why he is famous.	Which room has the most electrical sockets in a house? Why?	Conduct a simple circuit independently. Which metal is the best conductor?	Identify, label and sort materials as conductors and insulators.	Find examples of electrical insulators in the classroom.	How has electricity changed the way we live?