

Subject: Science

At Bingham Primary School, we structure our Science work around seven key skills from Nursery through to Y6. These are based on the research from the Primary Science Teaching Trust (2019) and this methodology has been chosen because it provides a clear transition from the Plan, Do, Review system that was established in EYFS through the curriculum structure. The aim is to make all children active participants in their science journey and also supports the ethos of autonomy and reasoning outlined in the positive learning behaviour policy.

Within their scientific learning, children will be encouraged to follow the following seven principles and children will be explicitly taught (through the use of key vocabulary and symbology) when they are using each particular skill.

The symbols will be used on the whiteboards while teaching, around the classrooms and in the written work to show how the lessons are meeting the requirements of the school's own Non-negotiables of Working Scientifically.

Asking questions

Asking questions that can be answered using a scientific enquiry.



Making predictions

Using prior knowledge to suggest what will happen in an enquiry.



Setting up tests

Deciding on the method and equipment to use to carry out an enquiry.



Observing and measuring

Using senses and measuring equipment to make observations about the enquiry.



Recording data

Using tables, drawings and other means to note observations and measurements.



Interpreting and communicating results

Using information from the data to say what you found out.



Evaluating

Reflecting on the success of the enquiry approach and identifying further questions for enquiry.



	KS1	Lower KS2	Upper KS2
Plan	ask simple questions and recognising that they can be answered in different ways	ask relevant questions and using different types of scientific enquiries to answer them → set up simple practical enquiries, comparative and fair tests	plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
Do	observe closely, using simple equipment perform simple tests identify and classify	make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers	take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
Record	gather and record data to help in answering questions.	gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Review	use their observations and ideas to suggest answers to questions	report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions → use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions → identify differences, similarities or changes related to simple scientific ideas and processes → use straightforward scientific evidence to answer questions or to support their findings	use test results to make predictions to set up further comparative and fair tests → report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations → identify scientific evidence that has been used to support or refute ideas or arguments

Lesson Structure:

In order to ensure that science vocabulary, critical thinking, reasoning and applying scientific knowledge are embedded into every lesson, each lesson will start with:

- **‘Fluency 5’ style questions. (Max of 5 minutes)**

This is where previous concepts and learning are briefly recapped in a planned revision, to stimulate the memory, require the children to recall and remember and refresh skills and knowledge required for future learning.

These can be answered on a whiteboard to ensure all participate and the Teacher can assess and act on the results.

A selected number of lessons will begin with (in addition to Fluency 5):

- **Pictures for Talk (max 10 minutes)** ([Pictures for Talk | Primary Science Teaching Trust \(pstt.org.uk\)](https://www.pstt.org.uk/))

We believe that a carefully planned and selected picture can be a very good stimulus for children to engage in effective talk in science. Using pictures is an inclusive approach which facilitates high levels of participation. Pictures can also be used as a starting point for inquiry. The discussions the children have will generate questions that they want to investigate.

Asking the children carefully chosen questions about a picture will support them with learning to

- construct explanations and link their ideas with evidence
- make confident challenges to the ideas of others
- explore scientific terminology and use it with genuine understanding

<u>Fluency 5</u>	<u>Pictures for Talk</u>	<u>Plan</u>	<u>Do</u>	<u>Record</u>	<u>Review</u>
<u>5 mins</u>	<u>10 mins</u>	<u>20 mins</u>	<u>30 mins</u>	<u>30 mins</u>	<u>15 mins</u>
See above	See above	This is where new concepts and skills/knowledge are taught. Expectations of learning activities and outcomes are set out. Children will be asked key questions to support their personal progress. Children will be encouraged to frame their own questions about what is being asked of them.	Children are supported to participate in a range of scientific enquiries and investigations. In all lessons, they will be encouraged to observe, talk about their observations and use a range of equipment in increasing levels of sophistication and complexity as they move through the school.	Children will, over time be taught to record their investigations in the appropriate format. Initially, this might use some scaffolding, however over time and as early as possible they will be enabled to record for themselves and to be able to select the appropriate format in which to record. The recording might be simultaneous with the activity or might be in a separate lesson time.	Children need to be able to put their findings into context by being taught how to use that information to answer questions and progress with their understanding of key scientific elements and principles. This would mean that at the end of the lesson there would need to be an important chunk of time left for review and discussion and this will be planned carefully with clear expected outcomes to which children's progress can be assessed against.

Science in the National Curriculum

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

- The national curriculum for science aims to ensure that all pupils:
- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Key Stage: KS1 and 2

Key stage 1:

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

Lower KS2 – Y3 and 4

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

Upper KS2 – Y5 and 6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read, spell and pronounce scientific vocabulary correctly.

Non-Negotiables: every lesson must use elements of 'Working Scientifically' pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content. All classes will work scientifically through the system of Plan, Do, record, Review.

Key stage 1:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions

Pupils in years 1 and 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions.

They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships.

They should ask people questions and use simple secondary sources to find answers.

They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.

These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.

Lower Key Stage 2 (Y3 and 4)

- asking relevant questions and 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.

Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data.

With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected, and finding ways of improving what they have already done. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.

Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.

These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study.

Upper KS2 (Y 5 and 6)

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.

They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.

They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.

These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.

Vocabulary Check – this list is not exhaustive, but a minimum expectation:

It will be expected that ALL classrooms from Y1 upwards have a number of appropriate age-related Science Dictionaries (at least 1 between 2) that are on ongoing and continual access for all children.

1	2	3	4	5	6
<u>Working scientifically</u>		<u>Working scientifically</u>		<u>Working scientifically</u>	
question, answer, observe, observing, equipment, identify, sort, group, compare, differences, similarities, describe, measurements, test, results, secondary sources record – diagram, chart		oral and written explanations, conclusion, predictions, criteria, classify, changes, data, contrast, evidence, improve, secondary sources, guides, keys, construct, interpret research – relevant question equipment – thermometer, data – gather, standard units, record, classify, present record – drawings, labelled diagrams, keys, bar charts, tables		plan, variables, measurements, accuracy, precision, repeat readings, predictions, further comparative and fair test, identify, classify and describe, patterns, systematic, quantitative measurements report data – scientific diagrams, labels, classification keys, tables, scatter graphs, bar graph and line graphs report and present – conclusions, casual relationships, explanations, degree of trust, oral and written display and presentation evidence – support, refute, ideas or arguments biology, physics, chemistry	
<u>Plants</u>	<u>Plants</u>	<u>Plants</u>	<u>Living things and their habitats</u>	<u>Living things and their habitats</u>	<u>Living things and their habitats</u>
deciduous, evergreen, tree, leaf, flower (blossom), petals, fruit, bulb, seed,	growth, germinate, light, temperature reproduce, lifecycle	air, water, transportation, nutrients, soil, reproduction, seed	vertebrates, invertebrates (+ 1 example of each) environment, habitat, classification key	life process, reproduction, offspring,	characteristic, classification, organism, micro-organism

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roots, stem, trunk, branches		formation, seed dispersal, pollination			
<u>Animals, Including Humans</u>	<u>Animals, Including Humans</u>	<u>Animals, Including Humans</u>	<u>Animals, Including Humans</u>	<u>Animals, Including Humans</u>	<u>Animals, Including Humans</u>
amphibians, fish, reptiles, mammals, birds (+ 1 example of each) herbivore, omnivore, carnivore head, nose, ear, neck, shoulder, arm, elbow, wrist, hand, back, chest, hip, leg, knee, ankle, foot wing, beak, tail, fin sight, smell, touch, taste, hearing	survival, water, air, food reproduce, adult, baby, offspring, kitten, calf, puppy food chain, prey, predator, camouflage, protection exercise, hygiene, balanced diet	skeleton, skull, bones, muscles, movement, support, protection, nutrition	mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine, nutrients, absorb, canine, incisor, molar producer, consumer, apex predator	womb, foetus, embryo, gestation, baby, toddler, teenager, elderly growth, development, puberty	function, circulatory system, heart, valve, blood vessel, vein, artery transport, oxygenated, deoxygenated lifestyle, drug
<u>Everyday Materials</u>	<u>Use of everyday materials</u>	<u>Rocks</u>	<u>States of matter</u>	<u>Properties and changes of materials</u>	<u>Evolution and inheritance</u>
wood, plastic, glass, paper, metal, rock hard, soft, rough, smooth, shiny, dull, bendy, stiff	brick, fabric, elastic, foil property, solid, waterproof, absorbent, opaque, transparent, squash, bend, flexible, twist, stretch push, pull, roll, slide, bounce	soils, organic matter, fossil, crystal sandstone, granite, marble, pumice absorbent, crumble sedimentary, layer, sediment igneous, magma, lava, gas bubbles (tiny holes/spaces) metamorphic, change, squeeze, pressure	solid, liquid, gas, evaporation, condensation, particle, temperature, freezing, heating	hardness, transparency, conductivity (electrical, thermal) solubility, solution dissolve, filter, evaporate, sieve, reversible, irreversible	adaptation, evolution, characteristic reproduction, genetics, survival
<u>Seasonal Changes</u>	<u>Living things and their habitats</u>	<u>Light</u>	<u>Sound</u>	<u>Earth and Space</u>	<u>Light</u>
season, spring, summer, autumn, winter, month, year, day, night, sun, moon, light, dark	living, dead, habitat, microhabitat, woodland, meadow, hedgerow, pond	light source, mirror, reflect, reflective, reflection shadow, blocked transparent, translucent, opaque	vibration, wave, volume, pitch, tone, insulation	Earth, sun, moon, solar system, axis of rotation, day, night, phases of the moon, star, constellation	refraction, reflection, spectrum, rainbow
		<u>Forces and Magnets</u>	<u>electricity</u>	<u>Forces</u>	<u>Electricity</u>

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		force, contact, surface, magnetic, attract, repel, poles	appliance, battery power, main power, circuit, series, cell, battery, wire, bulb, switch, break in circuit conductor, insulator	air resistance, water resistance, friction, gravity lever, gear, pulley, Newtons	Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell
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Sequence of learning:

R – Recall - where learners are recapping and consolidating prior learning in order to know more and remember more

N – New learning, where new skills/concepts/knowledge are introduced into the sequence

USE the SKILLS AND KNOWLEDGE EXPECTATIONS ABOVE TO PLAN FOR DIFFERENTIATION OF COMPLEXITY OF EXPECTATION AND OUTCOME IN MIXED AGE CLASSES.

Most knowledge components are chunked in to 2-week blocks, within this will be the opportunity (and the expectation) for class teachers to plan recall activities, experiments and exploration opportunities as part of the scientific pedagogy. The new learning aspect is the outcome (or composite) expected from the two-week chunk.

Each unit will not fit neatly into a half term – so teachers will continue the learning until the unit is finished. This will ensure that the sequence and building of knowledge comes first and is not dependent on a topic-based approach that muddles the sequence.

There is time tied in to the annual Science cycle for additional weeks to be spent on content if children have not acquired the intended knowledge needed to move on to the next component. It is good practice to secure sound knowledge before moving on. There will be an expectation that children's knowledge will be assessed as they move through the components as well as as a composite at the end of the unit of work.

Key Stage 1

	Year 1 NC outcomes:	Year 2 NC outcomes:
Plants Weeks:	- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees - identify and describe the basic structure of a variety of common flowering plants, including trees	- observe and describe how seeds and bulbs grow into mature plants - find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
1 and 2	What is a plant? Go out into the environment and find as many examples as possible. Learn in the environment what a plant needs to live and grow healthily. Plant a seed – create a recording system to monitor growth and change, use a transparent pot so changes with the seed can clearly be seen.	Recall – what is a plant, what plants do you know and recognise? New learning – the life cycle of a plant – following the journey of a seed or bulb. Learn the vocabulary related to germination and growth. Plant a seed of choice, plan the way it will be monitored over time using self-designed chart and managing the variables of what they think the seed will need. Set a class control so they can compare against – children taught what a control is. Plan to review weekly – growth, change, how they cared for it.
3 and 4	What are the main parts of a plant? Stem, leaf, flower, root. Use this vocab when monitoring change in the plant they are growing. Learn to identify these on a range of different plants provided. Relate to a range of different plants.	Recall – parts of a plant – relate to a number of different plants that don't look the same, flowers, vegetables, trees, shrubs, weeds etc. Recall – lifecycle of a plant and do this in New learning - Add to sophistication of parts by adding seeds, fruits, etc.
5 and 6	What is a tree? What names of trees do you know? Recall the main parts of a plant and relate to trees. Establish key vocabulary for the parts and a basic outline of what the parts do for the tree. Learn the terms deciduous and evergreen and examples of both.	Recall – what is a tree, what are its component parts? Refer back to prior learning about other plants. New learning - Add more sophisticated scientific vocabulary for parts and functions of parts including how it takes up water and uses leaves to process light.

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7 and 8	What kind of trees are in our school locality? To be able to use an information sheet with leaves on and to be able to match real leaves and identify them in the environment... Recall – evergreen and deciduous by sorting trees into the environment into groups.	Recall – types of trees common in the UK Recall – evergreen or deciduous and how do you know which tree is which? New – be able to understand and retell how important trees are in the environment and why we need them.
9 and 10	Look at deciduous trees and learn about how they change through the seasons. Be able to explain the cycle in simple terms using the name of the season and a description of what happens to the tree – with a simplistic 'why' statement i.e. the tree loses its leaves in Autumn because... Go on a second nature walk (fieldwork) in the local environment to use the environment to observe how and where plants grow. (the pond/lake across the road) and use/apply the information they learned to identify plants and trees in the environment. Use technology to record their findings.	Recall – seasonal changes for trees, New learning - how the environment can damage trees and look at what a healthy tree looks like compared to a healthy one. Why is this bad for us? Use fieldwork to embed and recall main aspects of the unit's learning. Spot different types of trees and sort into the groups using learned criteria for deciduous and evergreen.
Animals (including humans)	- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals - identify and name a variety of common animals that are carnivores, herbivores and omnivores - describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) - identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	- notice that animals, including humans, have offspring which grow into adults - find out about and describe the basic needs of animals, including humans, for survival (water, food and air) - describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene
1 and 2	Teach the vocabulary of groups of living things – fish, birds, reptiles, amphibians, insects and mammals. Make sure the children become familiar with the terms and are able to sort some basic examples of each into the relevant group.	Recall – the terminology of grouping living things – use the word classification. Recall – can they give examples of each? New learning – learn what living things need as the basics for survival and understand that living things have basic needs and these are mostly the same. Without these things they couldn't live. Relate to own life and need.
3 and 4	Learn the terminology herbivore, omnivore and carnivore. Understand what each of those terms mean.	Recall – basics of what is needed to survive, focus on the types of food that living things eat Recall terminology herbivore, omnivore, carnivore from Y1 New learning - children will be able to understand that animals have offspring
5 and 6	Recall - terminology herbivore, omnivore and carnivore. New learning - Learn/identify examples of each from categories of living things i.e. birds, fish, mammals, reptiles. Be able to describe in simple terms what makes them birds or amphibians or reptiles. Be able to say whether an animal came from an egg or was born.	Recall – categorise and classify creatures into their correct group with examples from each. Give a description of a feature of each of the groups and begin to understand that some features of classes of animals are not present in all examples i.e. ask – Can all birds fly? New learning: children will be able to describe a simple life cycle of a living thing, remembering that different animals have offspring in different ways i.e. eggs or live birth.
7 and 8	Recall – remember what animals (pets, farm, wild) are mammals Learning about humans- humans are mammals, be able to say in very simple terms - what makes a mammal? New learning – the names of baby animals and be able to match these with the parent.	Recall – what animal has what baby? New learning – Children will be able to talk about how you would care for a pet from a baby i.e kitten or a puppy, and fill its basic needs, as well as how they would ensure they kept it healthy. They would be able to talk about diet, exercise and keeping it (or its environment) clean.
9 and 10	Learning about humans – what do I know about my body? Recall – basic human anatomy vocabulary – Head, legs, hands, ensure children know the visible external parts of the body and the correct terminology.	Recall – humans are mammals. what makes a mammal? Recall – what kept a pet healthy? New learning – how would you keep a baby healthy and safe? Think about the basic needs and how to meet them

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	New learning – children will be able to know and understand that their body is made up of different types of tissue, bone, skin, muscle, cartilage.	
11 and 12	Learning about humans Recall – basic parts of the body, tissue types. New learning – children will be able to talk about the function of specific parts of the body in relation to their 5 senses. They will be able to explain what the senses are, how they use them and what parts of the body are involved.	Recall – keeping a baby healthy – what you need to make sure they have New learning – children will be able to expand their understanding to themselves to talk about how they could keep themselves healthy. Children should be able to talk about diet, exercise and keeping clean.
Everyday Materials	- distinguish between an object and the material from which it is made - identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock - describe the simple physical properties of a variety of everyday materials - compare and group together a variety of everyday materials on the basis of their simple physical properties	- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses - find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
1 and 2	Exploration – what is it made of?? Explore a range of objects and talk about what they think it is made of They will be able to identify a range of materials from common everyday familiar objects made of: wood, plastic, fabric, stone, glass and metal. They will be able to distinguish the name of an object from the material that it is made of. Children will learn that some materials are man-made and some are natural.	Recall – how to identify a range of materials from common everyday familiar objects made of: wood, plastic, fabric, stone, glass and metal. New learning: be able to handle a variety of unusual
3 and 4	Recall – identify the material Recall – natural or manmade Use and apply knowledge in a walk around the school to identify materials in the environment. New learning – for children to understand and to be able to describe in simple vocabulary the simple physical properties of materials and why they are used for certain jobs. Develop descriptive vocabulary about colour, texture, density and mass. What can you do with different materials? Stretch, bounce, snap, tear, bend. Sort into a simple diagram to record.	Recall: for children to remember and to be able to describe in simple vocabulary the simple physical properties of materials and why they are used for certain jobs. Develop descriptive vocabulary about colour, texture, density and mass. New learning – children should be able to explore properties of materials deeper and use more sophisticated and ambitious vocabulary to describe their properties about transparent, opaque, brittle, New learning: Learn about how materials are selected for a particular purpose depending on their properties. Look for materials in the environment and match the property to purpose. Think about properties that are beyond what they can touch or see, i.e. waterproof, fire retardant, flexible, stretchy.
5 and 6	Recall understand and to be able to describe in simple vocabulary the simple physical properties of materials New learning – children will be able to sort materials into groups based on the properties (simple i.e. made of wood, stone, glass etc)	Recall: to be able to select a property of choice and use the key vocabulary to describe it and select objects based on that criteria, so children should be able to show that they have understood the criteria and can seek and find it in everyday objects. New learning: Some materials can have their shape changed by having a force applied i.e. push (squishing) and pull (stretching). Children should know some materials for which that is possible and some for which it is not possible for them to do. They should be able to say key vocabulary to describe the force/action they are using and it's effect i.e. bending, stretching, squashing, twisting.
7 and 8	Recall: how to sort objects with the same properties into groups. New learning: select a property of choice (i.e. bendy) and use the key vocabulary to describe it and select objects based on that criteria, so children should be able to	Recall: to recall which materials they could change and which ones they could not and recall the vocab that describes the action and the impact of the action.

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	show that they have understood the criteria and can seek and find it in everyday objects.	New learning; learn how more than one chemical or material are put together to make the material's properties change i.e. wax coating to make waterproof,	
Seasonal Changes	- observe changes across the 4 seasons - observe and describe weather associated with the seasons and how day length varies	Living things and their habitats	- explore and compare the differences between things that are living, dead, and things 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, and how they depend on each other - identify and name a variety of plants and animals in their habitats, including microhabitats - describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food
1	Recall – from the work done in term 1 about the names of the season and what happens to the trees. Make sure they can say the names of the seasons and understand they go in order and follow on from each other in a never-ending cycle. New learning – break down the seasons into a cycle and attach them to certain months of the year. Make sure children know the names of the months of the year.	Recall – different classifications of animals from term 1. New learning – children need to understand the terms living and dead and understand what plants look like when they are dead. Relate this to animals too. Understand that animals can die.	
2	Recall – months of the year, seasons in the cycle. New learning - Children need to learn the basic weather attributes of the seasons and simple events that happen in them.	Recall – alive or dead New learning – some things have never been alive. Children should be able to look at simple objects and be able to say whether they are alive, dead or never been alive. Challenge can be added through trickier objects such as shells (never alive) or coral (dead)	
3	Recall: weather in the seasons New learning – dig deeper into seasonal events in winter so that children can understand that some life hibernates, some plants die back to their roots, some animals change colour.	Recall – alive, dead, never been alive. Sort and go through some examples. Recall – conditions living things need to live and survive/thrive from term 2 New learning – children will be able to talk about the place animals live typically is called their habitat. They will be able to name and describe a number of animals and their respective habitats	
4	New learning – dig deeper into seasonal events in spring – how things look like they come back to life, what a 'bud' is, lambing etc.	Recall - name and describe a number of animals and their respective habitats Children will understand that an animal's behaviour, diet and needs are very linked to the habitat that they live in. make the links between some examples and plot the needs, behaviour and why their habitat is suited to them.	
5	New learning – dig deeper into seasonal events in summer – in particular bees and flower pollination ready for fruiting.	Recall – habitats and the needs of the animals that live there New learning – focus in on the need for food. Look at herbivores, carnivores and omnivores as recall. New learning – learn about food chains and how different species of animals and plants have interdependence.	
6	New learning – dig deeper into seasonal events in autumn – how nature is preparing for winter. Seed dispersal and how fruits and berries play their part in this and the co-dependent relationship between plants and animals for this purpose i.e birds eating berries and spreading the seeds through their poo.	Recall – what is a food chain? Recall – what is interdependence? New learning – identify different sources of food for different animals and why habitats are chosen. New learning – what happens when a habitat disappears??	

Lower Key Stage 2

	Year 3 NC outcomes:		Year 4 NC outcomes:
Plants	- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers - explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant - investigate the way in which water is transported within plants - explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	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
Weeks:			
1 and 2	Recall: learning from KS1, what a plant is, its basic parts and what plants need to survive. New learning: attach key functions to all the parts of the plant learned in KS1. relate the parts and functions to a wider spread of plants, be able to use and apply the knowledge to a range of flowering and fruiting plants as well as trees.	Recall: learning from KS1 about the classification of animals, remember the groups learned about before. New learning: children will be able to simplistically explain how classification works and how this information is recorded in charts i.e. Kingdoms and look at the groups. Can they think of examples from the Kingdoms they are familiar with?	
3 and 4	Recall: Parts of plant and functions. Use scientific vocabulary and explain its meaning, encouraging children to be precise. New learning: examine the requirements of plants for life and how they keep healthy. This goes beyond water and soil as in KS1. Plus, look at how this varies from plant to plant i.e. cactuses, air plants, trees etc. Think about room to grow.	Recall – remember the Kingdoms New learning – children will be able to look at the Kingdom of the animals and understand how this smaller group is split and sorted again into smaller groups. i.e. vertebrates and invertebrates – children should be able to understand both of these terms.	
5 and 6	Recall: parts of plant with scientific names and conditions needed for life. New learning: children should learn the way that plants take on water and transports it to where it is needed. They should be able to give a simple explanation and use scientifically correct terminology where appropriate with confidence.	Recall: the animal kingdom and how it is sectioned. Fieldwork: go out into the local (school) environment to find and record where they found living creatures. Children will be able to use their observations of what they know from prior learning to be able to classify and sort the creatures they find into groups from the animal kingdom. Talk about where they live and where they found them linked to habitat work done in KS1. Children will be able to discuss with the wider class if any creatures prove problematic to sort.	
7 and 8	Recall: how plants take up water and move it round their system New learning: Plants have a life-cycle, which children need to have a basic understanding of. Children need to be able to say the part that a flower plays in this and understand that in order for the lifecycle to be completed external factors such as seed dispersal and pollinators are needed. Special attention should be given to the importance of bees!	Recall: remember the importance of the bees from Year 3 in pollination of plant species. New learning: As a case study, children will be able to talk about the importance of bees in the environment and how and why changes to the environment have had a detrimental impact on bee populations locally, nationally and globally.	
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	- 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	

	identify that humans and some other animals have skeletons and muscles for support, protection and movement	construct and interpret a variety of food chains, identifying producers, predators and prey
1 and 2	Recall – learning from Y2 relating to keeping healthy with food. Balanced diet: animals and 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 Children need to learn what types of food groups there are i.e. protein, carbohydrate, fats and sugars, fruit and vegetables, etc. be able to sort food into each group.	Children will have a clear understanding that humans have different types and shapes of teeth for different purposes. They will be able to look at a picture of a set of teeth and be able to name at least incisors, molars and canines. They will be able to give a simplistic explanation of what each type of tooth does.
3 and 4	Recall – -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 New learning – use the knowledge they have gained about food groups to understand mixing a number of items to get a balanced diet. Begin to understand the impact on the body if certain elements of the diet are missing, therefore understanding in a simple way what the body does with each type of food i.e. how we get energy or why we need fresh fruit for vitamins etc.	Recall – name and describe the functions of three types of teeth. Recall from KS1 learning about how to keep teeth healthy via brushing. New learning – children will need to understand the key factors that damage teeth and what steps people can take to lessen that over time. New learning – look at what happens to food when it gets chewed by the teeth
5 and 6	Recall – from KS 1 recall the materials and tissue that the body is composed of. New learning -Identify that humans and some other animals have skeletons and that the bones have names (learn some of the simplest) -Identify the main body parts associated with the skeleton, finding out how different parts of the body have special functions.	Next steps – where the food goes when it's been chewed! Children need to understand that in order for the body to get the nutrition it needs from food, the body has to process the bits it wants and get rid of the bits it doesn't. This is called digestion. New learning – what the map of the body parts that deal with digestion look like and where they are. What the organs are called.
7 and 8	Recall – what the skeleton looks like and where key bones are -learn that humans and some other animals have a skeleton and muscles for support and protection. -learn and be able to remember the main body parts associated with the muscles, finding out how different parts of the body have special functions.	Recall – where the digestive organs are and what they are called. New learning – children need to be able to describe the simple functions of the basic parts of the digestive system in humans and tell the story of what happens to chewed food from when it enters the digestive system to when it exits via the anus. Children need to have a simple understanding of what happens in each stage of the journey and the scientific name and functions of each organ
9 and 10	-Identify that humans and some other animals have muscles -Identify the main body parts associated with the muscles, finding out how different parts of the body have special functions.	Recall – human teeth. What were the shapes and functions of the different types of teeth New learning – children need to be able to relate that form and function relationship to animals that have different diets i.e. Herbivores, Carnivores, Omnivores Learn that depending on an animal's diet, they will have different teeth shapes and formations in order to be able to eat efficiently. Children should be able to make a decision about whether an animal is a herbivore, carnivore, omnivore based on looking at their teeth and to be able to give a reasoned explanation for their choice.
11 and 12	Recall – where in the body? Recall the location of some bones and muscles from last lesson. -Identify that humans and some other animals have a skeleton and muscles for movement and begin to understand how muscles act with bones to create movement. Muscles only push.	Recall – teeth of different consumers Recall – humans and animal are unable to produce their own food. Recall – most plants are able to produce their own food and these are called producers, but there are exceptions to the rule and some plants need to attract food! New learning – animals that eat other animals are called predators. New learning – animals and their need for food will fit into what is called a food chain.

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	-Identify the main body parts associated with the muscles, finding out how different parts of the body have special functions.	Children will be able to understand a simple food chain and how it is constructed, will be able to identify producers and consumers, prey and predators.	
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;	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
1 and 2	New learning: children will understand what light actually is and to be able to say that dark is the absence of light. Identify that light can be made by different means, natural light, electric, fire, etc.	New learning – what do we mean by solids, liquids and gases. Children need to understand the vocabulary and be able to give a simple explanation from memory. Children need to have the experience of being able to Compare and group materials together, according to whether they are solids , liquids or gases and then to be able to use and apply that knowledge in order to explore a variety of everyday materials and develop simple descriptions of the states of matter.	
3 and 4	Recall: what is light and what is dark. New learning: natural things that make light. Look at the sun, moon and stars. Chemicals in nature that make light Understand that the moon looks light because it reflects the light from the sun, whereas the sun is light because it is made up of fire and burning gas. Children will be able to know and understand not to look at the sun directly due to the damage it can do to the eyes.	Recall – make sure that the children know the vocab and definition of solid, liquid and gas and be able to give some examples. New learning – children need to understand that the processes of heating and cooling can change the state of matter and materials and describe how this happens and what it looks like. Children should be given the opportunity to use their own prior knowledge to pick out examples of this from real life and explain their reasoning. Children should be able to design a test that shows the impact of cooling on a material such as water.	
5 and 6	Recall: how the moon reflects the light of the sun New learning: children will be able to say how and why light is reflected from surfaces.	Recall – what are the different states of matter, what happens when water cools New learning – what will happen when water is heated? This can be applied to what happens to a range of materials when they are heated. Children should be able to hypothesise and check whether they were correct.	
7 and 8	Recall: reflection of light from surfaces. New learning – what is a shadow? Children will be able to understand what a shadow is and how it is formed. They will be able to understand what opaque means and be able to spot objects that are opaque.	Recall - How heating and cooling change materials. New learning – reflect on when water was heated, what happened to the water? Children need to understand that the water did not disappear but did change state. They need to know that in water this is a reversible change. Children need to know the scientific vocabulary evaporation and condensation and how this creates a cycle for the state of water.	
9 and 10	Recall – how shadows are made by blocking a source of light by an opaque object. New learning: make shadows with a range of objects and understand the shape of the shadow related to the location of the light source. Children should be able to manipulate the shadow and change its shape in a way they want to do it – i.e. predict the impact of the position of the light source.	Recall – the water cycle and reversible change New learning – some changes made by heating and cooling are not reversible. i.e. cooking, burning things to ash (what is ash? Why is it a powder? What has	

Forces and Magnets	- compare how things move on different surfaces - notice that some forces need contact between 2 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 2 poles - predict whether 2 magnets will attract or repel each other, depending on which poles are facing	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
Forces 1 and 2	Compare how things move on different surfaces. Understand what a force is - A force is a push or pull that causes a change in speed, direction or shape. Some forces are affected by speed, other forces are not. All forces come in pairs, no force exists by itself. Be able to describe this to others. Explore moving things around using pushes and pulls and attributing the correct force to what is happening i.e. throwing a ball, then throwing a ball attached to a string.	1	Introduction – what is sound and how are sounds made? Children need to be able to use in context key scientific vocabulary to describe this process and explain it to someone else.
Forces 3 and 4	Recall – the definition of a force New learning – learn that Gravity is a force and it pulls an object to the ground. New learning – that some things can affect the speed at which objects move and form resistance. Children need to try pushing objects on different surfaces to test what happens. Then, draw conclusions and form a simple hypothesis based on their testing. (explain what a hypothesis is and encourage them to use the word) Gathering and recording data to find answers to their questions -Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment,	2	Recall – remember learning about the senses in Y2. Focus in on hearing and how the ear is made. New learning – sound is only heard because the ear is constructed to receive the sound waves. look at the construction of the ear, with the external ear, ear canal and ear drum. The children need to know and understand that sound is heard when the waves hit the drum and eardrum vibrates. They need to know what vibrates means.
Magnets 5 and 6	Recall – what is a force and how can surfaces impact on speed and direction of movement. New learning – children will understand that some objects and forces need contact with 2 objects to create movement i.e. a hand pushing a toy car, bat hitting a ball etc. New learning magnetism is a force. Children need to understand what a magnet is and how it produces a magnetic field. This magnetic field is invisible but is responsible for the most notable property of a magnet: a force that pulls on other ferromagnetic materials, such as iron, steel, nickel, cobalt, etc. and attracts or repels other magnets. New learning – the meaning of the terms Attract and repel when using magnets New learning – children need to be able to use and apply this new knowledge in thinking what would be good practical uses for magnets in every day life. This could perhaps be from experience or imagination.	3	Recall: how sound gets to the ear drum and how it vibrates. New learning: children need to understand how volume is made in sound, with stronger vibrations making louder sounds. Children should explore making different sounds and look at sound patterns of volume made by different objects.

Magnets 7 and 8	Recall – what is magnetic force and what can magnets do? Recall – the terms attract and repel and use this to learn how magnetic force does not require two objects to come in to contact relating this back to forces needed to move some objects. New learning - Children need to be able to observe how magnets attract or repel each other and attract some materials and not others Magnetic Strength – children do need to know that magnets have different strength due to having different magnetic fields. They should be able to set up a test where they Explore the strengths of different magnets and find a fair way to compare them	4	Recall – that stronger waves make louder sounds. New learning – you can insulate to reduce the sound waves getting to your ear drums and children need to be able to compare materials (recall of information) as to which form the best insulation against sound. Children need to be able to formulate a fair test to check these materials and to record in a scientific format.
Magnets 9 and 10	Recall – magnetic force New learning - children need to learn and be able to verbalise that magnets have 2 poles – north and south poles. On some magnets this will be in a different colour to help you. How would you find out if it wasn't marked? <i>The area of the magnetic field where the magnet's power is the strongest is called the magnetic poles. If a magnet is hung so that it is free to turn, it will turn in the north-south direction. The end that faces the north is called the north-seeking pole, or north pole, of the magnet.</i> New learning – children need to be able to describe what happens when 2 magnets are put near each other with all possibilities/combinations of the poles. How can this be recorded in a systematic way as you test? Children need to be able to relate this information to what they know about the globe and the poles of the globe.	5	Recall – how sound waves are made and received by the ear. New learning – children need to be able to explain that sound waves lose their strength the further they have to travel. Children should be able to design a simple experiment to show this and test it out.
Magnets 11 and 12	Recall – poles of a magnet and what happens. New learning – using the systematic testing in the last lesson are children able to Predict whether 2 magnets will attract or repel each other, depending on which poles are facing -Look for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another Magnetic forces -Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance	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
		1	Introduction Understand that some objects and gadgets need electricity to make them work. Understand what electricity is – the presence of charged particles. Sometimes this power comes from batteries and sometimes it comes from being plugged in to mains electricity. Children need to be able to understand the difference between the two and to be able to name some from both groups.
		2	Recall – how is electricity made and objects and gadgets that use it.

		Children need to be able to understand how electricity travels once you know where the source is (i.e. battery or mains) to actually make the gadget work. They need to be able to say that electricity travels in circuits – and to understand what a circuit is and what a simple circuit looks like and is constructed from. (components) -Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers -Construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches Learn how to draw and record the circuits they make as a pictorial representation (not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6)
	3	Recall – what makes the components of a successful working circuit. -Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers -Use their circuits to create simple devices. -Draw the circuit as a pictorial representation (not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6)
	4	Bulb Brightness -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 -Observe patterns: *That bulbs get brighter if more cells are added
	5	Switched On -Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
	6	Conductors and insulators -Recognise some common conductors and insulators, and associate metals with being good conductors -Observe patterns: *That metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

Upper Key Stage 2

	Year 5 NC outcomes:		Year 6 NC outcomes:
Living things and their habitats Weeks:	- 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	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
1 and 2	Recall – learning from KS1 about life cycles, that some animals produce live young and some lay eggs. Animals grow and mature into adults that then reproduce. New learning – that life cycles are different for different members of animal kingdom groups. children need to be able to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird, using key scientific vocabulary.	Grouping organisms -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 -Through observations, classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). -Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	
3 and 4	Recall - Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird using correct vocabulary. New learning – that reproduction is part of the life cycle. Children need to understand that animals and birds do not all reproduce in the same way. Look at mammals and how their young gestate (what this means and looks like in terms of how the foetus grows inside) and grow inside specially equipped organs in the body and what those are called in scientific terms. Children need to know that gestation periods for different animals are different lengths of time. They should be able to give 1 or 2 examples of this.	Similar Organisms Recall - Describe how living things are classified into broad groups according to common observable characteristics and based on similarities, including micro-organisms, plants and animals -Give reasons for classifying animals based on specific characteristics -Discuss reasons why living things are placed in one group and not another. -Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	
5 and 6	Recall – reproduction in mammals and how gestation works. New learning – compare to another way animals reproduce i.e. look at how a bird develops in an egg over time or a reptile/fish. Children should be able to compare the growth of a foetus in a mammal to what happens inside an egg and draw simplistic similarities and differences. New learning – how the growing foetus gets nutrients and basic needs for life to grow inside an egg.	Classifying plants and animals -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 based on specific characteristics -Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	
7 and 8	Recall – work on the life cycle of a plant in KS1. Remember the parts of a plant they learned and how it gets the basic nutrients and needs met via the leaves, roots and flowers etc. New learning – children need to understand that plants also reproduce and this can happen in a number of ways sexual and asexual. Children should understand the meanings of those words related to plant reproduction sexual reproduction in plants requires interaction between two parts but asexual the plant can do on its own. They should start with flowering plants and how sexual reproduction in plants works.	Microorganisms -Describe how living things are classified into broad groups according to common observable characteristics and based on similarities, including micro-organisms, plants and animals -Give reasons for classifying animals and plants based on specific characteristics -Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	

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9 and 10	Recall – plants reproduce in different ways and Children should have the opportunity to dissect a flower (proper skills taught) to look at the organs in the flower that are being discussed. They should record their findings in detailed scientific drawings with labels. Children should be able to look at a range of different flowering plants and identify where their reproductive parts are.	Local Organisms -Describe how living things are classified into broad groups according to common observable characteristics and based on similarities, including micro-organisms, plants and animals -Give reasons for classifying animals and plants based on specific characteristics -Use classification systems and keys to identify some animals and plants in the immediate environment. -Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.
11 and 12	Asexual reproduction in Plants -Describe the life process of reproduction in some plants -Try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. Talk about grafting in fruit trees.	
Animals (including humans)	describe the changes as humans develop to old age	• 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
1	Recall – lifecycles from last term and KS1. Remember that humans reproduce and babies are born. Children need to be able to explain what changes happen to a baby in their first six months of life. What they are born being able to do; What changes in the body and in the brain as they grow What basic needs have to be met to ensure they grow successfully	Circulatory System -Identify and name the main parts of the human circulatory system Explore and answer questions that help them to understand how the circulatory system enables the body to function.
2	Recall – information about what babies need when they are first born. New learning – being a child. Look at	Heart matters -Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
3	Recall – birth to teenagehood growth and development New learning – how a human change from a child to an adult. Children need to understand what changes happen to your body when you get to puberty.	Food transport -Describe the ways in which nutrients and water are transported within animals, including humans
4	Recall – map the stages into adulthood New learning – changes to the body in adulthood. This may include having a baby (link to RHSE learning about relationships. This does not include at this stage learning about conception).	Diet and Exercise effects -Recognise the impact of diet and exercise on the way their bodies function -Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
5	Recall – the stages of development in to adulthood as a timeline. Children need to understand what happens to the body as it ages i.e. skin, hair, bone density and muscle strength diminishes. Children need to know that sometimes people get ill and this can be before they get to be old people. Children need to be able to explain how people can make decisions about their lifestyles and diet that will help them be healthier as they get old.	Drugs and Medicines -Recognise the impact of drugs and lifestyle on the way their bodies function -Learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.

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	Be able to record simple changes over time into a complete timeline.		
		Scientific research -Exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.	
Properties and changes in materials	- compare and group together 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 through filtering, sieving and evaporating - give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic - 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, including changes associated with burning and the action of acid on bicarbonate of soda	Evolution and inheritance	- Pupils should be taught to: - 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
1 and 2	Recall – learning about properties of materials from KS1. Children need to understand that one property of a material is that it might be soluble. Understand what this means, explore substances that dissolve and don't dissolve. Learn the vocabulary that relates to dissolving a substance in a liquid and forming a solution. Learn that a substance can be recovered from a solution because some changes are reversible (link to learning about cooling and heating in KS1)	How Living things have evolved -Identify how plants are adapted to suit their environment in different ways and that adaptation may lead to evolution -Observing and raise questions about local plants and how they are adapted to their environment	
3 and 4	Recall – learning about properties of materials from their learning in KS1 Children need to learn that they can compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets (Relate these to what they learnt about magnetism in year 3 and about electricity in year 4)	How Living things have evolved -Identify how animals are adapted to suit their environment in different ways and that adaptation may lead to evolution -Compare how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels.	
5 and 6	Recall – what properties do materials have and how can you check? Recall – that changes to materials can be reversible or might not be. Know the terminology reversible and irreversible. New learning – other materials solids, liquids, gasses, can be separated and children need to know the mechanisms to do this, filtering, sieving and evaporating.	How Living things have evolved -Identify how animals are adapted to suit their environment in different ways and that adaptation may lead to evolution -Variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox.	

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	Design an experiment where a set of compounds are split using different mechanisms i.e how would children separate a sand and water mix? Or a salt solution? Children need to be able to record their predictions and design a test and results in a scientific format.	
7 and 8	Recall – reversible changes New learning – children need to understand that when a new material is made by changing the state of other materials, these are usually irreversible. Look at what happens when ingredients are mixed together to make a cake or bread. Look at burning wood or paper outside Experiment with acid and bicarb of soda. Children should be able to predict by reasoning, whether changes are reversible or irreversible.	Advantageous Adaptation Recall - Identify how animals are adapted to suit their environment in different ways and that adaptation may lead to evolution -Analyse the advantages and disadvantages of specific adaptations, such as being on 2 feet rather than 4, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.
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	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
1	Earth and Sun -Describe the movement of the Earth and other planets relative to the sun in the solar system -Learn that the sun is a star at the centre of our solar system and that it has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). -Identify scientific evidence that has been used to support or refute ideas or arguments	How we see -Recognise that light appears to travel in straight lines
2	Earth, Sun and Moon -Describe the movement of the moon relative to the Earth -Understand that a moon is a celestial body that orbits a planet (Earth has 1 moon; Jupiter has 4 large moons and numerous smaller ones).	Reflection -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
3	Recall – the learning from KS 1 regarding the seasons and the conditions associated with all the seasons. -Describe the sun, Earth and moon as approximately spherical bodies and how they move, rotating as spinning spheres but also as an orbit around the sun (Earth) and around the Earth (the Moon)	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

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	Link how they move		
4	Day and Night -Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky -Compare the time of day at different places on the Earth through internet links and direct communication	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	
5	Geocentric vs Heliocentric -Find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.	Creating shadows -Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them -Investigate the relationship between light sources, objects and shadows by using shadow puppets.	
6	Clocks -Constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day -Finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.	Refraction of light -Extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters (they do not need to explain why these phenomena occur).	
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	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
1	Recall – learning about space and the way the planets move and spin. Children should be able to simplistically explain that gravity is a force that pulls objects to the surface of the planet and keeps planets in orbit around the sun	1	Recall learning about electricity from Year 4 Remember how to Construct simple circuits Learn how to construct simple series circuits
2	Recall – what is gravity. Children need to be able to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object -Find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. -Identify scientific evidence that has been used to support or refute ideas or arguments	2	Recall – making a circuit and naming the components New learning – children need to know and recognise (and draw) Circuit Symbols -Use recognised symbols when representing a simple circuit in a diagram -Represent a simple circuit in a diagram using recognised symbols.

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3	Friction -Identify the effects of friction, that act between moving surfaces -Explore the effects of friction on movement and find out how it slows or stops moving 4objects, for example, by observing the effects of a brake on a bicycle wheel. -5Report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations	3	New learning – children should be able to make circuits with a wider range of circuit Components Then, be able to use their acquired knowledge to be able to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. -Use test results to make predictions to set up further comparative and fair tests
4	Air Resistance -Identify the effects of air resistance that act between moving surfaces -Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. -Exploring falling paper cones or cupcake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. -Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	4	Bulb Brightness Buzzer Volume -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 test results to make predictions to set up further comparative and fair tests
5	Water Resistance -Identify the effects of water resistance that act between moving surfaces 6-Explore resistance in water by making and testing boats of different shapes. -Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	5	Circuit Components Change -Systematically identifying the effect of changing one component at a time in a circuit
6	Leavers, Pulleys, Gears -Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect -Design and make products that use levers, pulleys, gears and/or springs and explore their effects.	6	Children should be able to use all their complied composite knowledge to use and apply these to undertake a Design Making challenge. -Designing and making a set of traffic lights, a burglar alarm or some other useful circuit. -Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

