John Keble CE School

Science Curriculum

Rooted together in love, growing without limits.

Believing in the worth of every individual, we are a nurturing, Christian sanctuary of learning, where all can flourish. We aspire for everyone to achieve heights of success, to deepen courage and to experience breadth of creativity, knowing the joy of God's love.

Whole school curriculum intent
Our ambitious, knowledge-rich curriculum has been sequenced to equip our pupils with the knowledge and skills to ensure they are happy, healthy global citizens, ready to take their place in modern Britain. The broad and balanced curriculum is creative, coherent and inclusive and, together with our Christian values, enables the pupils to be self-motivated, independent learners.
Subject specific curriculum intent: science
At John Keble, we desire to give every pupil to develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. They will 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. Finally pupils will be equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.
Implementation and impact:
The units in the science curriculum are grouped by key stage, with a suggested route organised within year groups. The substantive knowledge (i.e. the science content) will be taught in units, and the disciplinary knowledge (i.e. working scientifically) is taught in context. Hierarchical elements of working scientifically are reflected in the units and built up accordingly. Each unit is rich in vocabulary and working scientifically is woven into most lessons. The curriculum is designed to be able to support all pupils. The units are pitched so that pupils with different starting points can access them. Pupils need to have a large amount of subject knowledge stored in their long-term memory in order to become competent at any subject, and this is especially true of science, where application is often an application of knowledge. For this reason, these lessons are designed to teach science in a clear and deliberate fashion, emphasising secure content knowledge before moving on to tasks. In this approach, the teacher is the subject expert and the emphasis is on instruction and explanation, followed by deliberate practice supported by modelling, guided practice and scaffolding. Models and analogies will be used where appropriate to allow pupils to visualise or contextualise abstract ideas. At the end of each unit, pupils will be given an end of unit task. This will be an opportunity for the pupils to showcase their learning and what they have understood in a task. Class teachers will be able to use it as a tool to assess the pupils.

Introduction to John Keble's key stage 1 and 2 science curriculum

Each unit of work is 6 lessons long and designed to last roughly one-half term. The following curriculum map provides complete coverage of statutory topics contained within the national curriculum. Further units that go beyond the national curriculum are also included, to help pupils better understand the subject and the world, as well as preparing them for the next stage of study.

Year Group	Term	Unit Title	Year Group	Term	Unit Title
1			2		
	Spring	Seasonal changes		Spring 1	Living things and their habitats
	Summer 1	Everyday materials		Summer 1	Uses of everyday materials
	Summer 2	Plants Animals including humans		Summer 2	Plants Animals including humans
3	Autumn 1	Light	4	Autumn 1	Electrical circuits / Sound
	Autumn 2	Practical skills		Autumn 2	States of matter
	Spring 1	Raw and synthetic materials		Spring 1	Rock cycle
	Spring 2	Plants		Spring 2	Human anatomy
	Summer 1	Adaptations		Summer 1	Ecosystems
	Summer 2	Magnetism		Summer 2	Sound
5	Autumn 1	Forces / Earth and space	6	Autumn 1	Light / Electricity
	Autumn 2	Separating mixtures		Autumn 2	
	Spring 1	Physical and chemical changes		Spring 1	
	Spring 2	Reproductive cycles		Spring 2	
	Summer 1	Space		Summer 1	Animals including humans
	Summer 2	Notable scientists		Summer 2	Living things and their habitats Evolution and inheritance

KS2 sequence recommendations

At the front of this document, we listed the sequence in which we suggest teaching the key stage 2 science units. Teachers should note that whilst this sequence adheres to the National Curriculum in terms of teaching content within the correct key stage, not all content is taught in the year group suggested by the National Curriculum. Where that is the case, the rationale is below. The affected units have been deliberately designed so that they can be taught in any sequence.

- 'States of matter' unit should be taught before 'separating mixtures', 'Physical and chemical changes' and 'Particles in physical and chemical changes'.
- 'Rock cycle' is taught in Year 4 after the 'States of matter' as there are lots of references to changes of state in this unit.
- 'Light & dark' and 'Forces' be taught before 'Space'.
- 'Plants' is taught before 'Ecosystems' and 'Adaptations'.
- 'Notable scientists' could be taught in any year group. This unit has been designed to teach pupils about a diverse group of scientists in a range of different fields. Each lesson will be designed to be standalone so that lessons could be taught in isolation if there is not enough time in your school's plans to include the whole unit. For example, if teaching the unit 'Space', then the lesson on Katharine Johnson from the 'notable scientists' unit could be taught in conjunction as there are many links.
- 'History of Science' is a unit that could be placed flexibly but it covers ideas taught in 'Space', 'Raw and synthetic materials', 'Electricity' and 'Human anatomy'. While the lessons will be accessible without the knowledge from these units, it would be better suited for UKS2 as it will provide knowledge from these units to be consolidated.
- The 'Electrical circuits' unit is in Year 4 but can also be used for Year 6 as it includes all of the statutory requirements of electricity on the Year 6 national curriculum.
- The 'Practical skills' unit could be taught in any year group. It goes through each stage of conducting a scientific investigation and writing a report of the investigation. Each lesson from this unit could also be taught in isolation and included in curriculum plans to suit the needs of your pupils. For example, the lesson on writing a method could be taught as a refresher if this is a skill you think your pupils need more practice on. Or the lesson on scientific conclusions could be taught before undergoing an investigation in a different unit or topic.

Key stage 1 and 2 science working scientifically links - 2023 - 2024 onwards

Links to the statutory requirements for working scientifically have been made explicit for each unit. Generic statements have been used for simplicity:

- Asking questions
- Performing tests
- Observing and measuring
- Gathering and recording data
- Identifying and classifying
- Using equipment
- Planning and setting up different types of enquiries
- Reporting, presenting and communicating data/findings

Year	Unit	Working scientifically links	Year	Unit	Working scientifically links
1	Materials	Asking questions Performing tests Observing and measuring Gathering and recording data Identifying and classifying	2	Changing materials	Asking questions Performing tests Observing and measuring Gathering and recording data Identifying and classifying
	Building things	Asking questions Observing and measuring Gathering and recording data Identifying and classifying		Mixing and making	Asking questions Observing and measuring Gathering and recording data Identifying and classifying
	The animal kingdom	Identifying and classifying Performing tests Using equipment Observing and measuring Gathering and recording data		Human lifestyle	Performing tests Using equipment Observing and measuring Gathering and recording data
	Plants	Performing tests Observing and measuring Gathering and recording data Identifying and classifying		Habitats	Identifying and classifying
	Seasons and change	Observing and measuring Using equipment Gathering and recording data		Space	N/A

	Sound	Observing and measuring Using equipment		Extraordinary scientists	Asking questions Performing tests
3	Light & dark	• Observing and measuring • Using equipment • Identifying and classifying	4	Electrical circuits	• Planning and setting up different types of enquiries • Using equipment • Gathering and recording data • Observing and measuring • Identifying and classifying
	Practical skills	• Performing tests • Using equipment • Observing and measuring • Gathering and recording data • Reporting, presenting and communicating data/findings		States of matter	• Observing and measuring • Identifying and classifying • Gathering and recording data
	Raw and synthetic materials	• Identifying and classifying • Reporting, presenting and communicating data/findings		Rock cycle	• Identifying and classifying
	Plants	• Asking questions • Performing tests • Observing and measuring • Gathering and recording data • Reporting, presenting and communicating data/findings		Human anatomy	• Identifying and classifying
	Adaptations	• Identifying and classifying		Ecosystems	• Asking questions • Identifying and classifying
	Magnetism	• Performing tests • Observing and measuring • Identifying and classifying • Gathering and recording data		Sound	• Asking questions • Performing tests • Observing and measuring • Identifying and classifying • Gathering and recording data
5	Space	N/A	6	Light	• Performing tests • Gathering and recording data • Observing and measuring

					● Identifying and classifying
	Separating mixtures	● Reporting, presenting and communicating data/findings		Particles in physical and chemical changes	● Performing tests ● Observing and measuring
	Physical and chemical changes	● Planning and setting up different types of enquiries ● Observing and measuring ● Gathering and recording data ● Reporting, presenting and communicating data/findings ● Particles in physical and chemical changes ● Performing tests ● Observing and measuring		Sustainability	● Identifying and classifying Reporting, presenting and communicating data/findings
	Reproductive cycles	● Identifying and classifying		Humans and animals over time	N/A
	Notable scientists	● Observing and measuring		Diet and lifestyle	● Observing and measuring
	Forces	● Performing tests ● Gathering and recording data ● Observing and measuring		History of science	● How scientific ideas and evidence change over time

National Curriculum – Key Stage 1

Year Group	Unit	National Curriculum objectives	Where covered
KS1	Working scientifically	● 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.	See table above
1	Plants	● 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.	Yr 1 Su2 Yr 1 Su2
1	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.	Yr 1 Su2 Yr 1 Su2 Yr 1 Su2 Yr 1 Su2
1	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.	Yr 1 Sum 1 Yr 1 Sum 1 Yr 1 Sum 1 Yr 1 Sum 1
1	Seasonal changes	● observe changes across the four seasons ● observe and describe weather associated with the seasons and how day length varies.	Yr 1 Sp Yr 1 Sp

2	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.	Yr 2 Sp Yr 2 Sp Yr 2 Sp Yr 2 Sp
2	Plants	● 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.	Yr 2 Su2 Yr 2 Su2
2	Animals including humans	● notice that animals, including humans, have offspring which grow into adults ● find out about and describe the basic needs of animals, including humans, for survival (water, food and air) ● describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Yr 2 Su2 Yr 2 Su2 Yr 2 Su2
2	Uses of everyday materials	● 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.	Yr 2 Su1 Yr 2 Su1

National Curriculum – Key Stage 2

Year Group	Unit	National Curriculum objectives	Where covered
3 / 4	Working scientifically	● 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.	See table above
3	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.	Yr 3 Sp2 Yr 3 Sp2 / Yr 5 Su1 Yr 3 Sp2 Yr 3 Sp2
3	Animals, including humans	● identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat ● identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Yr 4 Su1 / Yr 6 Su1 Yr 4 Sp2

3	Rocks	● compare and group together different kinds of rocks on the basis of their appearance and simple physical properties ● describe in simple terms how fossils are formed when things that have lived are trapped within rock ● recognise that soils are made from rocks and organic matter.	Yr 4 Sp1 Yr 4 Sp1 Yr 3 A2 / Yr 4 Sp1 / Yr 5 Su1
3	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.	Yr 3 A1 Yr 3 A1 / Yr 6 A1 Yr 3 A1 / Yr 6 A1 Yr 3 A1 / Yr 6 A1 Yr 3 A1 / Yr 6 A1
3	Forces and magnets	● compare how things move on different surfaces ● notice that some forces need contact between two objects, but magnetic forces can act at a distance ● observe how magnets attract or repel each other and attract some materials and not others ● compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials ● describe magnets as having two poles ● predict whether two magnets will attract or repel each other, depending on which poles are facing	Yr 3 Su2 Yr 3 Su2 Yr 3 Su2 Yr 3 Su2 Yr 3 Su2 Yr 3 Su2
4	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	Yr 4 Su1 Yr 4 Sp1 Yr 4 Su1 / Yr 5 Su1
4	Animals, including humans	● describe the simple functions of the basic parts of the digestive system in humans ● identify the different types of teeth in humans and their simple functions	Yr 4 Sp2 Yr 4 Sp2 Yr 4 Su1

		● construct and interpret a variety of food chains, identifying producers, predators and prey	
4	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.	Yr 4 Au2 Yr 4 Au2 Yr 4 Au2
4	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	Yr 4 Su2 / Yr 5 Su1 Yr 4 Su2 Yr 4 Su2 Yr 4 Su2 Yr 4 Su2
4	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.	Yr 4 Au1 / Yr 5 Su1 / Yr 6 Au1 Yr 4 Au1 / Yr 6 Au1 Yr 4 Au1 / Yr 6 Au1 Yr 4 Au1 / Yr 6 Au1 Yr 4 Au1 / Yr 6 Au1
5 / 6	Working scientifically	● 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	See table above

		● 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 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.	
5	Living things and their habitats	● describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird ● describe the life process of reproduction in some plants and animals.	Yr5 Sp2 Yr5 Sp2
5	Animals including humans	● describe the changes as humans develop to old age.	Yr 4 Sp2 / Yr 6 Su1
5	Properties and changes of 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	Yr 3 Sp1 / Yr 6 Sp1 Yr5 A2 / Yr5 Sp1 / Yr 6 A2 Yr5 A2 / Yr 6 A2 Yr 5 Sp1 Yr5 Sp1 Yr5 Sp1
5	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.	Yr5 A1 / Yr 5 Su 1 Yr5 A1 / Yr 5 Su 1 Yr5 A1 / Yr 5 Su 1 Yr5 A1 / Yr 5 Su 1

5	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.	Yr 5 Au 1 Yr 5 Au 1 Yr 5 Au 1
6	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 microorganisms, plants and animals ● give reasons for classifying plants and animals based on specific characteristics.	Yr5 Sp2 / Yr 6 Su2 Yr5 Sp2 / Yr 6 Su2
6	Animals including humans	● identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood ● recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function ● describe the ways in which nutrients and water are transported within animals, including humans.	Yr 6 Su1 Yr 6 Su1 Yr 6 Su1
6	Evolution and inheritance	● recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago ● recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents ● identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	Yr 6 Su2 Yr 6 Su2 Yr 6 Su2
6	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.	Yr 6 A1 Yr 6 A1 Yr 3 Su1 / Yr 6 A1 Yr 6 A1
6	Electricity	● associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit	Yr 4 Au1 / Yr 6 A1 Yr 4 Au1/ Yr 6 A1

		• 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.	Yr 6 A1 Yr 4 Au1 / Yr 6 A1

Cross Curricular vocabulary links,
Where words are coloured not in black, this means these words may appear in other subjects
Music
Maths
History
Geography
Design Technology
Literacy

Year 1 - Science				
Term	**Children learn about…**	**Children learn how to…**	**Vocabulary**	
Spring	**Seasonal changes** -observe changes across the four seasons -observe and describe weather associated with the seasons and how day length varies.	Explore the different weather- go out into different weather, describe what I see and talk about some dangerous weather, record the different weather over a week and begin to collect data Collect and measure rainwater over a period of time and talk about what I am measuring with an adult Ask questions about the weather and recognise that they can be answered in different ways Observe changes across the four seasons, pictures etc, tree leaves and compare Observe and describe weather associated with the seasons and how day length varies Collect and compare leaves Begin to communicate my findings in a variety of ways Say how science helps us in our daily lives, e.g. weather forecasts	Winter Summer Spring Autumn Rain Sun Dangers	Snow Sleet Wind Storm Thunder Lightning
Summer 1	**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.	Distinguish between an object and the material from which it is made Explore different materials and identify and name a variety including wood, plastic, glass, metal, water and rock Describe simple physical properties of a variety of everyday materials Classify- compare objects- sort them based on simple physical properties e.g. odd one out, guess how I sorted them, how many different ways can you sort… Ask questions and recognise that they can be answered in different ways Begin to communicate my findings in a variety of ways Say how science helps us in our daily lives	Wood Rock Glass Brick Plastic Metal Hard Stiff Paper	Shiny Dull Rough Smooth Bendy and not bendy Wool Soft Stretchy
Summer 2	**Plants** -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.	Identify and name a variety of common wild and garden plants and different types of tree Classify and compare different plants/leaves/flowers Observe over time- growing different plants and use simple equipment such as magnifying glasses Explore by making models of plants - including the different parts of a plant Ask questions and recognise that they can be answered in different ways Begin to communicate my findings in a variety of ways Begin to find information in books and other sources Say how science helps us in our daily lives	Deciduous Evergreen Leaves Flowers Blossom Petals Fruit	Roots Bulbs Seeds Trunk Branches Stem Grow

	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.	Identify, name draw and label body parts, measure using cubes and compare with other class members Explore - is the oldest person in the class the tallest person? Does the tallest person in the class have the biggest feet? Identify and name a variety of common fish, amphibians, reptiles, birds and mammals Identify and name, classify and compare animals which are carnivores, herbivores and omnivores Describe and compare different common animals Ask questions and recognise that they can be answered in different ways Say how science helps us in our daily lives	Carnivores Herbivores Omnivores Fish Amphibians Birds Mammals Head Neck Arms	Legs Knees Face Ears Eyes Hair Mouth Teeth Elbows
	Working scientifically	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.		

Year 2 - Science				
Term	**Children learn about…**	**Children learn how to…**	**Vocabulary**	
Spring	**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	Explore and compare the differences between things that are living, dead, and things that have never been alive Explore- where do living things live? – park/school- record 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 Classify - compare and sort animals from different habitats- which one is the odd one out, how have I sorted the animals, alive/dead/never alive Explore- petri dish- sucking up bugs and observing with magnifying glass Collect data - tally chart / record in a table a bug hunt in the playground (keep a bug hotel) Create simple food chains and describe how animals obtain their food from plants and other animals Identify and name different sources of food Ask simple questions about the world around us and use observations and ideas to suggest possible answers Use different types of enquiry to answer questions Communicate findings in a variety of ways	Living Dead Alive Never alive Habitat Micro-habitat Food chain Leaf litter Bright Shade/Dark	Shelter Seashore Woodland Ocean Rainforest Desert Conditions Hot/Cold/Warm Dry/Damp/Wet
Summer 1	**Uses of everyday materials** -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.	Explore - which materials can you name and find? Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching Classify - sort materials based on their uses e.g. odd one out, guess how I sorted them, how many different ways can you sort… Investigate: Which material is best; which paper is best for wrapping a present; which ball is the bounciest? Etc… Comparative test- which material would be good to make a slide, an umbrella etc Identify and compare the suitability of a variety of everyday materials for particular use (including wood, metal, plastic, glass, brick, rock, paper and cardboard) Ask simple questions about the world around us and use observations and ideas to suggest possible answers Use different types of enquiry to answer questions. Explain how I carried out my enquiry Suggest simple changes to my enquiry	Stretch Waterproof Fabric Ceramic Squash Bend Twist	

		Use simple scientific language to explain what they are doing Use comparative language Begin to explain what happened in an experiment and how I might change it		
Summer 2	**Plants** . 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.	Observe and describe how seeds and bulbs grow into mature plants, growing a variety of plants- comparing similarities and differences Ask simple questions about the world around us and use observations and ideas to suggest possible answers	Reproduce Germinate Produce Seedlings Scent	
		Investigate with fair test how plants need water, light and a suitable temperature to grow and stay healthy. Can plants grow without food/water? Do plants grow better the more they are watered? Use different types of enquiry to answer questions.		
	Animals including humans -notice that animals, including humans, have offspring which grow into adults - find out about and describe the basic needs of animals, including humans, for survival (water, food and air) -describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	Notice that animals, including humans, have offspring which grow into adults and observe through different sources: how do humans and animals grow? How do caterpillars turn into butterflies	Living Non-living Compare Same Different Sight/See Hear/Sound Taste Feel/Touch	Smell/Scent Small/Smallest Large/Largest Big/Biggest Short/Shortest Tall/Tallest
		Describe the basic needs of animals, including humans, for survival (water, food, air) Describe the importance of exercise, eating the right amounts of different types of food and hygiene Explore – the body and its functions, how do you feel when you exercise? Explore - Do people with the longest legs jump the farthest? Do people with the longest arms throw the farthest? Classify - healthy vs unhealthy food Identify the different types of human teeth and their functions		
		Ask simple questions about the world around us. Use different types of enquiry to answer questions.		
	Working scientifically	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.		

Year 3 - Autumn 1 Light

Year 3 - Science			
Term	**Children learn about…**	**Children learn how to…**	**Vocabulary**
Autumn 1	**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	Recognise that light is needed to see and dark is an absence of light Investigate different materials and how they reflect light/block light Explore- reflecting light with mirrors, playing with shadows. Can you see in the dark, does shining a torch show a difference? Understand risk in science- risks from the Sun for eyes Recognise that shadows are formed when a light source is blocked by an opaque object Identify pattern seeking- how do shadows change size? Set up simple inquiries Record results Begin to decide how to record data Begin to draw simple conclusions from my results Make predictions/suggestions from my results using straightforward scientific evidence Ask relevant questions and use different types of enquiry to find answers	Reflect Surface Natural Artificial Shadow Block Torch Candle Lamp Sunlight Light sources Shine opaque

Year 3 - Autumn 2 Practical skills

NC objectives:Working scientifically				
Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Explain what a variable is	• Define a dependent, independent and control variable • Know how to plan a 'fair test' • Identify the variables in a range of experiments	Change Dependent Independent	Variables Control Fair test
2	Draw a scientific diagram	• Know the difference between a diagram and an illustration • Identify good scientific diagrams • Draw a range of scientific diagrams	Diagram Illustrations Labels	Accurate
3	Understand the importance of a method	• Identify a good method • Follow the instructions in a method • Write a method for an investigation	Method Instructions Adverbs of time	Present tense Variables Fair test
4	Present a set of data	• Describe how to collect results • Draw a results table • Know how to present results	Results Data Unit of Measure	Conduct Graph Chart
5	Interpret a set of results	• Know how to interpret results • Write a conclusion • Know how to present a conclusion	Results Evidence Unit of Measure	Conclusion Investigation PEE model
6	Write a complete investigation	• Draft an investigation report • Know how to edit an investigation report • Redraft an investigation report	Results Data Unit of measure	Increment Conclusion Variables

Year 3 – Spring 1 Raw and synthetic materials

● NC objectives: Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency				
Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Explain what raw materials are	● Explain what a raw material is. ● Sort raw materials based on where they come from ● Describe the uses of some raw materials	Raw Synthetic Material Flexible	Malleable Durable
2	Explain what synthetic material are	● Explain what a synthetic material is ● Sort materials into synthetic and raw materials ● Describe the uses of some synthetic materials	Raw Synthetic Material	Malleable Durable Flexible
3	Describe how synthetic materials made from raw materials	● Explain that raw materials change properties when made into synthetic materials ● Describe how glass is made from sand ● Describe how the properties of sand change to the properties of glass	Raw Synthetic Material Flexible	Malleable Durable
4	Explain how paper is made	● Describe how paper is made from wood ● Describe a range of uses of paper ● Explain why it is a good thing to recycle paper	Raw Synthetic Material	Malleable Durable Flexible
5	Explore what recycling is and why it is important	● Describe what the process of recycling involves ● Explain that making synthetic materials takes energy ● Explain the negative impact of using raw materials	Raw Synthetic Material	Recycling Recyclable Pollution
6	Describe what it means to live sustainably	● State what 'sustainably' means ● Describe ways to live sustainably ● Explain some difficulties with living sustainably	Raw Synthetic Material	Recycling Recyclable Biodegradable

Year 3 – Spring 2 Plants

- NC objectives: 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

Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Investigate the conditions we change to investigate the growth of a plant	• The 3 main types of variables • What a plant needs to survive • How to plan an investigation into the factors that affect plant growth	Variable Control variable Independent variable Dependent variable	Nutrients Record Practical investigation
2	Explain what the parts and functions of a plant are	• The main parts and functions of a plant • How to draw a scientific diagram • How to write a conclusion for an investigation	Function Roots Absorb	Leaves Flower Seeds Stem
3	Explain what the parts and functions of a plant are	• The main parts of a flower • The functions of each of the main parts of a flower • How to identify the parts on a real flower	Function Sepals Ovule Filament Anther	Ovary Style Stigma Petal
4	Explain the parts of a plant's life cycle	• The parts of a flowering plant's life cycle • The conditions required for germination • Three ways in which seed dispersal takes place	Fertilisation Pollination Seeds	Conditions Disperse Germination
5	Describe how a plant transports water	• Describe what transpiration is • The three main steps of water transport in plants • How to prove that water moves up a plants stem	Stoma Seed Stomata	Expelled Transpiration Absorbed Wilt
6	Explain how plants adapt to different environments	• What a plant adaptation is • How plants adapt to extreme hot and cold • How plants adapt to attract animals or keep them away	Features Environments Conditions	Adapt Survive Adaptations

Year 3 – Summer 1 Adaptations

- NC objectives: Identify how animals and plants are adapted to suit their environment in different ways and that adaptation
- 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

Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Explain what an adaptation is	• Define an adaptation • Understand that adaptations are not a 'choice' • Learn a range of common adaptations as per vocabulary	Conditions Environment Organism	Characteristic Camouflage Adaptation
2	Describe how organisms have adapted to hot environments	• Describe the conditions of hot and dry environments • Adaptations of desert animals • Adaptations of desert plants	Conditions Environment Organism	Nocturnal Camouflage Adaptation
3	Describe how organisms have adapted to cold environments?	• Describe the conditions of cold environments • Common adaptations of animals to cold environments e.g. insulation • Make comparisons between organisms from different cold environments	Environment Camouflage Adaptation Conditions	Insulation Migration
4	Explain the adaptations nocturnal animals have made to survive	• Describe the conditions of night time environments • Compare the eyes of nocturnal and diurnal animals • How echolocation works	Adaptation Camouflage Echolocation Nocturnal	Pupil Diurnal
5	Describe how organisms have adapted to live underwater	• Describe the conditions of underwater environments • Common adaptations of fish • Common adaptations of marine mammals	Adaptation Camouflage Marine Streamlined	Oxygen
6	Describe how organisms have adapted to live in the deep sea	• Describe the conditions of deep sea environments • Common deep sea adaptations • Deep sea conservation	Adaptation Camouflage Marine	Conservation Transparent

Year 3 – Summer 2 Magnetism

- NC objectives: Compare how things move on different surfaces
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance
- Observe how magnets attract or repel each other and attract some materials and not others
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- Describe magnets as having two poles
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Explain what non-contact forces are	• What are forces • What are contact and non-contact forces • Name contact and non-contact forces	Magnet Attract Force Thrust	Repel Friction
2	Describe how magnets work.	• Know what magnets are • Describe when magnets attract and repel • Describe how to test the strength of a magnet	Magnet Force Repel	Attract Poles Friction
3	Describe how a compass works	• Explain what a compass is • Describe what a compass does • Describe how to make a compass	Magnet Force Repel	Attract Poles Friction
4	Use a diagram to show the strength of a magnetic field.	• Describe how field lines help us to understand the effect of an invisible force • Use a diagram of field lines to see where the force will be strongest and where it will be weakest	Plot Force Repel	Attract Poles Field
5	Describe how we can tell if a material is magnetic or not.	• Describe how to find out if a material is magnetic or not • State the difference between permanent magnets and temporary magnets • Name examples of magnetic and non-magnetic materials	Magnetic Force Permanent	Temporary Poles Field
6	Explain the uses of some uses of magnetic materials	• State what an electromagnet is • Describe how to make an electromagnet • Give examples of uses of magnets and electromagnets	Electromagnetic Force Permanent	Temporary Attract Repel

Year 4 - Autumn 1 Electrical circuits / sound

Year 4 - Science				
Term	**Children learn about…**	**Children learn how to…**	**Vocabulary**	
Autumn 1	**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	Explore- how sound is created by instruments Recognise that vibrations from sounds travel through a medium to the ear Ask relevant questions and use different types of enquiry to find answers Identify pattern finding (pitch, volume and distance) e.g.- sounds from different sized elastic bands, different sized saucepan lids Comparative testing and fair test- design ear muffs, create an instrument, identify similarities and differences Set up a simple practical test to investigate questions like "From how far away can you hear someone talking? How can you make sound quieter? How can we record vibrations?" Decide which enquiry is best to answer my question Careful and systematic observations Collect and decide how to record data Use comparative and superlative descriptions – loudest/quietest Gather, record and present data in a variety of ways (including oral and written explanations, displays or presentations) Use results to draw conclusions, make predictions and suggest further improvements or questions, using straightforward scientific evidence	Vibrate /tion / ing Volume Pitch Faint High Low String Percussion Woodwind Brass	
	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.	Identify appliances that run on electricity Explain how that electricity/light have improved our lives (including oral and written explanations) Carry out simple, independent research Explore- creating circuits, identifying and naming basic parts including cells, wires, bulbs, switches and buzzers Carry out a fair test- creating circuits Investigate lamps and switches in a series circuit Identifying pattern seeking- how do the circuits affect each other e.g switches, conductors, insulators Can you make a doorbell? Set up a simple practical test to investigate variables- decide which variables to change and which to keep the same Ask relevant questions and use different types of enquiry to find answers Recognise some common conductors and insulators, and associate metals with being good conductors	Electricity Appliances Circuit Cell Wire Bulb	Insulator Insulate Conductor Conduct Switch Buzzer

Year 4 - Autumn 2 States of matter

- NC objectives: 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

Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Explain the properties of solids, liquids and gases	• Describe what is meant by the property of a substance Name the properties of solids, liquids and gases • Explain which state of matter a substance is in based on its properties	Matter Properties Solid	Liquid Gas Compressible
2	Explain how particles behave inside solids, liquids and gases	• Describe what a particle is • Describe how particles are arranged in solids, liquids and gases • Explain how we know particles in liquids and gases are moving	Particles Flow Substance	Water vapour Arrangement
3	Describe what happens when you heat or cool each state of matter	• Describe what happens to particles when a substance is heated or cooled • Predict what happens to a solid, liquid or gas when it is heated or cooled • Give evidence to show that each state expands when heated and contracts when cooled	Vibrate Expanded Thermometer Contracts	
4	Describe what happens to the arrangement of particles when a substance changes state	• Describe what happens to the arrangement of particles when a substance changes state • Name each of the changes of state • Give an example of each change in state	Melting Boiling Bonds	Condensing Liquid Freezing
5	Explain what are melting points and boiling points?	• Describe what is meant by melting point and boiling point • Describe how it is possible to measure the melting point and boiling point of a substance • Suggest which state of matter a substance will be in given its temperature	Melting point Boiling point Celsius Degrees	
6	Explain how some substances do not show typical properties of one state of matter	• Give examples of substances that do not show typical properties of any state of matter • Explain how some substances do not show typical properties of one state of matter • Describe what a non-Newtonian fluid is	non-Newtonian fluids fluid Investigation	Force Consistency

Year 4 – Spring 1 Rock cycle

- NC objectives: Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that soils are made from rocks and organic matter.
- Explore and use classification keys to help group, identify and name

Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Know how igneous rock is formed	• Describe how igneous rock is created • Explain what intrusive and extrusive igneous rocks are • Know how to classify different types of igneous rock	Rock Igneous rock Grain Magma	Extrusive Lava Intrusive
2	Know how metamorphic rock is formed	• Describe what metamorphosis is • Describe how metamorphic rock is formed • Give the properties and uses of different metamorphic rock	Heat Properties Pressure	Metamorphosis Igneous rock Metamorphic rock
3	Describe how sedimentary rock formed?	• Describe how sedimentary rock is formed • Describe how fossils are formed • Explain how we can tell the age of a sedimentary rock	Sediments Pressure Palaeontologist Fossil	Sedimentation Compaction Cementation Sedimentary rock
4	Draw and use an identification key for rocks	• Describe what a geologist is • Describe how geologists classify rocks • Draw an identification key for rocks	Observing Identifying Identification key	Characteristics Geologist
5	Explore how rocks on our Earth's surface change	• Describe the effect that water can have on rocks • Describe what chemical weathering is and what it does • Explain how large earth movements can cause rocks to change	Weathering Magma Erosion	
6	Understand how the processes in the rock cycle fit together	• Understand how the processes in the rock cycle fit together • Know how to correctly order the processes in the rock cycle	Metamorphic Weathering Sedimentary	Erosion Igneous Magma

Year 4 – Spring 2 Human anatomy

- NC objectives: Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- 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
- Describe the changes as humans develop to old age.

Lesson number	Learning objective	Pupils will learn	Vocabulary		
1	Describe the functions of the major human organs	• Label major organs in human body • Describe the functions of the major human organs • Explain why organ donation is so important • Describe the journey food takes through our digestive system	Liver Respiratory Skin Organs	Brain Kidneys Intestine Lungs	Digestive Stomach Heart Circulatory
2	Explain the major bones in the human body	• Label the human skeleton • Describe the functions of the skeleton • Describe the difference between an endoskeleton and an exoskeleton	Skeleton Clavicle Exoskeleton	Skull Bones Ribs	Spine Joints Endoskeleton Femur
3	Compare the anatomy of a human to other animals	• Describe variation within the animal kingdom • Compare the human skeleton to other animals • Compare human organs to other animals	Skeleton Brain Exoskeleton Skull	Invertebrate Spine Gill Endoskeleton	Vertebrate Ribs Lung
4	Describe the function of the teeth and compare human teeth to other animals	• Compare the teeth of different animals • Identify the types of human teeth • Describe the function of different types of teeth	Skull Canine Herbivore	Molar Incisor Omnivore Carnivore	Teeth Wisdom Premolar Milk Teeth
5	Describe how oxygen transported around our bodies	• Explain why we need oxygen • Give the components of the circulatory system • Describe how the circulatory system works	Heart Carbon dioxide Arteries	Blood vessels Cells Lungs Veins	Blood Oxygen Platelets Circulatory
6	Explain how humans digest food	• Can label the major components of the digestive system • Describe the function of the different parts of the digestive system • Describe the journey food takes through our digestive system	Mouth Stomach Faeces	Saliva Acid Small intestine Large intestine	Digestive Oesophagus Enzymes

Year 4 – Summer 1 Ecosystems

- NC objectives: 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
- Recognise that living things can be grouped in a variety of ways
- Recognise that environments can change and that this can sometimes pose dangers to living things.
- Construct and interpret a variety of food chains, identifying producers, predators and prey

Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Describe different components of ecosystems	• Define a habitat and an ecosystem • Describe different components of ecosystems	Habitat Microorganism Ecosystem	
2	Classify the diets of animals	• Define carnivore, omnivore and herbivore • Give examples of carnivores, omnivores and herbivores	Habitat Microorganism Ecosystem	Carnivore Herbivore Omnivore
3	Explain why producers are so important	• How plants make their own food and why they are important	Habitat Microorganism Ecosystem	Producer Consumer Energy
4	Construct a food chain	• Label and construct food chains • Show energy transfer between organisms	Energy transfer Producer Food chain	Consumer Primary consumer Tertiary consumer
5	Construct a food web	• Show energy transfer on food webs • Draw a food web	Energy transfer Producer Food web	Consumer Primary consumer Tertiary consumer
6	Describe how removing one organism can cause disruptions to food webs	• Describe how removing one organism can have knock-on effects • Disruptions to food webs e.g. pesticides, deforestation, hunting	Energy transfer Producer Food web	Consumer Primary consumer Tertiary consumer

Year 4 – Summer 2 Sound

- NC objectives: 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.

Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Describe what sound is	• Describe what sound waves are • Describe how we can see sounds • Explain how we can stop sound	Sound Vibrations Particles	Ear Prevent Cochlea
2	Explain how different sounds are produced?	• Describe how sounds are produced in general • Describe ways that different sounds can be made • Make your own musical instrument	PItch Volume Instruments	Strike Pluck Blow
3	Explore pitch and frequency	• Describe what the pitch of a sound is • Describe ways to change the pitch of a sound • Give example of objects that produce high and low pitch sounds	Pitch Frequency Vibration	Hertz HIgh Low
4	Give examples of high amplitude and low amplitude sound	• Describe what we mean by the amplitude of sound • Describe how to change the amplitude of a sound • Give examples of high amplitude and low amplitude sound	Amplitude Decibels dB	Force Loud Quiet
5	Explain why scientists may want to dampen unwanted noise	• Describe the science of acoustics • Describe how scientists dampen unwanted noise • Describe how engineers build venues to improve sound quality	Acoustics Acoustician Atmosphere	Taut Amplified Absorbed
6	Investigate how sound can travel	• Explain how a string telephone works • Follow and write a method	Taut Amplified Vibrations	

Year 5 – Autumn 1

Year 5 - Science				
Term	**Children learn about…**	**Children learn how to…**	**Vocabulary**	
Autumn 1	**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.	Explore the impact of gravity and the effects of air resistance, water resistance and friction e.g. falling paper cones, paper aeroplanes, creating boats for water resistance Planning fair tests including recognising and controlling variables- designing and making parachutes, which shoe has the best grip? Which shape of paper plane flies the farthest? What shape of boat holds the most marbles? Research- Newton, Galileo and identify scientific evidence which has been used to support or refute ideas or arguments Take accurate and precise measurements using standard units Select equipment independently Draw causal conclusions about an enquiry Explain how levers, pulleys and gears allow a smaller force to have a greater effect	Gravity Air resistance Water resistance Friction Surface Effect Accelerate Decelerate Pulley Gear	
Autumn 1	**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.	Describe the movement of the Earth and other planets relative to the sun and the movement of the Moon relative to the Earth Explain day and night and the way the sun appears to move across the sky, using the idea of the Earth's rotation Begin to use simple models to explain my ideas Find the evidence to support or refute scientific arguments Research- about the planets, use google earth- how do we know the earth isn't flat? Does the sun move? Recognise which secondary sources are useful for my research Ask and answer questions about scientific phenomena Research independently		

Year 5 - Autumn 2 Separating mixtures

NC objectives: 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				
Lesson number	Learning objective	Pupils will learn	Vocabulary	
1	Understand what a pure substance is	• Define a pure substance • Give examples of pure substances • Explain how we can tell if something is pure or not	Pure Properties Particles	Substance Arrangement Impure
2	Explore what makes something a mixture	• Know what a mixture is • Give examples of mixtures of substances from the same state of matter • Give examples of mixtures of substances from different states of matter	Alloy	
3	Explain what a formulation is	• Describe what a formulation is and give examples • Explain why formulations are useful	Formulation Ratio	
4	Describe how we can separate mixtures into pure substances	• Describe how to remove large solids from a mixture • Describe how to remove insoluble substances from a mixture • Describe how to remove soluble substances from a mixture	Immiscible Missible	
5	Investigate different ways of separating materials	• Define 'solution', 'solute', 'solvent', 'soluble' and 'insoluble' • Describe how to use filtration to separate some mixtures • Describe how you can use evaporation to separate some mixtures	Insoluble filtration Evaporation	Solution Solute Solvent Soluble
6	Evaluate the method for separating substances in river water	• Separate substances in river water • Evaluate the method for separating substances in river water • Suggest how an environmental scientist could check the water quality in a river	Environmental scientists	

Year 5 – Spring 1 Physical and chemical changes

- NC objectives: 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
- 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.

Lesson number	Learning objective	Pupils will learn	Vocabulary		
1	Explain what happens to particles in substances that change state	• Describe how particles are arranged in solids, liquids and gases • Explain what happens to particles in substances that change state • Identify phase changes present in a range of examples .	Substances Diagram State of matter	Filtration Sieving Insoluble	Soluble Particles Condensing
2	Describe what a physical change is and how can we identify them	• Know what a physical change is • Describe signs that a physical change has taken place • Give examples of physical changes	Physical change Arrangement	Particles	
3	Describe what a chemical reaction is and how can we identify them	• Know what a chemical reaction is • Describe signs that a chemical reaction has taken place • Give examples of chemical reactions	Chemical changes Reactants	Chemical reaction Substance	Word equations Reaction
4	Explain the difference between physical and chemical changes?	• Describe the similarities and differences between physical and chemical changes • Identify whether a physical or chemical change has taken place • Suggest when a physical or chemical change may be useful	Combustion	Chemical changes	Reverse
5	Investigate chemical reactions	• Explain how to tell which reaction is larger Identify the variables in an acids and metals • investigation • Write a method for investigating a reaction between acids and metals	Variables Control variable	Vigorous Reaction	Independent variable Dependent variable
6	Investigate what happens when we place metals into acid	• Complete an investigation into acid and metal reactions • Evaluate evidence to make a conclusion • Know how to compare your results with other sets of results	reproducible repeatable reactive	anomaly	

Year 5 – Spring 2 Reproductive cycles

- NC objectives: 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.
- 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

Lesson number	Learning objective	Pupils will learn	Vocabulary		
1	Describe different methods of pollination and seed dispersal	• Label parts of a flower • Describe the stages of the life cycle of a flower plant • Describe different methods of pollination and seed dispersal	Pistil Germination Fertilisation	Stamen Petal Sepal	Pollination Seed Dispersal
2	Compare sexual and asexual reproduction in plants	• Know how some new plants can be grown from cuttings and bulbs • Know how to take a cutting • Compare sexual and asexual reproduction in plants and talk about the advantages and disadvantages of both	Bulb Runner Tuber	Sexual reproduction A sexual reproduction	
3	Compare similarities and differences between the life cycles of amphibians and insects	• Describe metamorphosis • Describe the main stages of the life cycle of an insect and an amphibian • Compare similarities and differences between the life cycles of amphibians and insects	Lifecycle Metamorphosis Insect Larva	Nymphs Amphibian Tadpoles	Embryos Pupa
4	Describe and compare the life cycles of different types of mammal	• Describe the process of sexual reproduction • Describe and compare the life cycles of different types of mammal	Lifecycle Mammals Gestation	Sexual reproduction Placental	Species Marsupials Monotremes
5	Identify the stages of a bird's life cycle	• Identify the stages of a bird's life cycle • Label the parts of an egg • Describe how some birds attract a mate	Egg Lifecycle Fledgling	Bird Chicken Nestling	Chick Hatchling
6	Explain the differences in the life cycles of different animals	• Explain the differences in the life cycles of different animals • Know how to report and present scientific findings	Lifecycle Bird Mammal	Amphibian Insect Species	

Year 5 - Summer 1 Space

- NC objectives: 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.

Lesson number	Learning objective	Pupils will learn	Vocabulary		
1	Describe how the Moon, Earth and Sun move around each other	• Describe how the Moon, Earth and Sun move around each other • Describe what happens during a lunar eclipse • Describe what happens during a solar eclipse • Find out about the universe	Solar eclipse Lunar	Orbit Satellite Celestial	
2	Name the different parts of the solar system	• Describe what the solar system is • Name the parts of the solar system • Explain the difference between comets, meteors and meteorites	Solar System Dust Moon	Planet Asteroid Meteor	Meteoroid Comet Meteorite
3	Explain how the planets in the solar system differ	• Name the planets of the solar system in order • Describe the difference between the inner and outer planets • Explain why Pluto is no longer considered a planet	Saturn Solar system Mercury	Neptune Planet Uranus	Meteor Earth Mars Venus Jupiter
4	Explain what stars and star constellations are	• Describe what different types of stars are • Describe what star constellations are	Stars Constellations Hydrogen	Gravity Red Giant Helium	Dwarf Sun Nuclear Fusion
5	Explain what the universe and what is it made from	• Describe what we mean by the universe • Describe what a galaxy is, including the Milky Way	Stars Galaxy Milky Way	Expanding Universe Billion	Big Bang Theory
6	Explore the importance of astronomers' work	• Describe what the work of an astronomer is • Name famous astronomers and what they discovered • Describe what astronomers are currently trying to find out about the universe	Star Universe Astrology Katherine Johnson	Ancient Mayans Horoscope Jocelyn Bell Burnell	Astronomy Ptolemy Copernicus

Year 5 – Summer 2 Notable scientists - change

- NC objectives: Identify how sounds are made, associating some of them with something vibrating
- Identify common appliances that run on electricity
- Recognise that environments can change and that this can sometimes pose dangers to living things.
- Recognise that soils are made from rocks and organic matter.
- 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
- Links to non-statutory guidance on a range of topics

Lesson number	Learning objective	Pupils will learn	Vocabulary		
1	Explore a scientist's achievements and contributions to science.	• Katherine Johnson's life story and contributions to science • How maths was used to safely send rockets to space and back	NASA Trajectory Flight path	Astronaut	
2	Explore a scientist's achievements and contributions to science.	• Alexander Graham Bell's life story and contributions to science • Describe how a basic telephone works • Look at the controversy over the telephone patent	Sound Deaf Vibration	Particles Patent	
3	Explore a scientist's achievements and contributions to science.	• Rachel Carson's life story and contributions to science • Describe how Carson's writing about pesticides helped inspire the creation of the US Environmental Agency • Write a letter about an environmental cause	Marine biologist Pesticides	Conservationist MP Constituent	
4	Explore a scientist's achievements and contributions to science.	• George Washington Carver's life story and contributions to science • Describe how Carver's research on crop rotation helped to improve crop yields globally	Crop Agriculture Slavery	Fertile Pests	
5	Explore a scientist's achievements and contributions to science.	• Stephen Hawking's life story and contributions to science • Describe how Hawking's research helped explain the Big Bang and black holes. • Present on a science topic of your choice	Black hole Big bang theory	Presenter Paralysed	
6	Explore a scientist's achievements and contributions to science.	• Marie Curie's life story and contributions to science • Describe Curie's discovery of radium and polonium and how her work paved the way for modern cancer treatments	Chemistry Physics	Radioactivity Cancer X-ray	

Year 6 – Science			
Term	**Children learn about…**	**Children learn how to…**	**Vocabulary**
Autumn 1	**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.	Explain how we see things because light travels from light sources to our eyes or from light sources to objects and then our eyes Explore how light travels in straight lines, how do we see? Where to place the rear view mirror on cars? Explain how objects are seen because they give out or reflect light into the eye by using the idea that light travels in straight lines Plan fair tests including recognising and controlling variables - making periscopes How can you make light bend? Do shiny surfaces reflect light better than dull surfaces? Explain conclusions/ideas with scientific vocabulary and reasons Take measurements including with repeat readings to improve accuracy Distinguish between opinion and fact Explain which parts of our lives rely on science	Reflection Spectrum Periscope Filters
	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.	Investigate pattern seeking - exploring circuits- how do they affect each other? E.g. brightness of bulbs, loudness of buzzers etc and give reasons for variations in how components function Make accurate and precise measurements Decide what to observe, for how long and whether to repeat Explain my ideas with scientific reasons Use scientific conventions- trends, rogue results- to support prediction Use findings to set up further enquiries and make predictions Use recognised symbols in a circuit diagram Record data and results – choose how best to present it and communicate findings using detailed scientific language Explore/ investigate fair test- Can you make a lighthouse? Can you make a bulb brighter? What materials conduct electricity? Can you build a switch? Can you make a warning device- alarm, guard the sweets?	Voltage Brightness Volume Motor Symbols
Summer 1	**Animals including humans** -identify and name the main parts of the human circulatory	Explain how the circulatory system works including the heart, blood vessels and blood	Circulatory system Liver Bladder

	system, and describe the functions of the heart, blood vessels and blood -recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function -describe the ways in which nutrients and water are transported within animals, including humans.	Recognise the impact of diet, exercise, drugs and lifestyle on the body's function Research how to keep body healthy, effect of drugs, diet, exercise Recognise which secondary source will be the most useful to my research Explore- what changes in my body during exercise, diet etc… What type of exercise affects the pulse rate the most? Does your pulse rate stay higher if you exercise for longer? See how science is useful in lots of different ways Explain which parts of our lives rely on science Explain the positive and negative effects of scientific development	Kidneys Blood vessels Red /white blood cells Platelets Plasma Exercise Drugs Substances Digest/tion/tive system
		Explain how nutrients and water are transported within animals including humans	
Summer 2	**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 microorganisms, plants and animals -give reasons for classifying plants and animals based on specific characteristics.	Describe how living things are classified according to common characteristics and similarities and differences, including micro-organisms, plants and animals Classify / group animals based on vertebrates/invertebrates e.g. venn diagram, carroll diagram Research- unknown animals/plants and classify them Use keys and other information records to classify and describe living things	Micro-organisms Classification
	Evolution and inheritance -recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago -recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents -identify how animals and plants are adapted to suit their environment in different ways	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Identify scientific evidence which has been used to support or refute ideas or arguments	Fossils Evolve/ evolution Offspring Variation Vary Identical/ non-identical Characteristics Adapt Environment Advantages/ disadvantages Extreme Inherit/ inheritance
		Recognise how living things produce offspring of the same kind but how offspring vary and are not identical to their parents Explain the positive and negative effects of scientific development	
		Identify how animals and plants and adapted to suit their environment in different ways and that adaptation may lead to evolution Research- Darwin Classify how are animals suited to their environments Explore- using tongs and tweezers to explore adaptation in birds – whoever can pick up the most beads survives Recognise which secondary source will be the most useful to my research	

	and that adaptation may lead to evolution.		
	Working scientifically	-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 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.	