RFS Planning & Progression: Science

Curriculum Intent

At Redcastle Family School, our **intent** is to give every child a broad and balanced Science curriculum which enables them to confidently explore and discover what is around them, so they have a deeper understanding of the world we live in. We want our children to love science. We want them to have no limits to what their ambitions are and we want them to grow up wanting to be astronauts, forensic scientists, toxicologists or microbiologists. As one of the core subjects taught in primary schools, we give the teaching and learning of Science the prominence and relevance it requires.

Our Science curriculum is designed to develop all children's knowledge, vocabulary and curiosity about the local environment, and the universe beyond and promotes respect for the living and non-living. Maturing Scientific knowledge and conceptual understanding will be delivered through **the Key Threads of: Biology, Chemistry and Physics, underpin by Working Scientifically**. These key threads within science are taught progressively to build a solid subject foundation and a breath of scientific vocabulary, which children can use confidently and contextually, this is visible within each topic we teach. Our comprehensive science curriculum clearly meets the aims of the new National Curriculum for Science.

Key skills are also mapped for each year group and are progressive throughout the school. These too ensure systematic progression to identified skills end points which are in accordance with the Working Scientifically skills expectations of the National Curriculum. Our curriculum is designed to ensure that children are able to acquire key scientific knowledge through practical experiences; using equipment, conducting experiments, building arguments and explaining concepts confidently. The school's approach to science takes account of the school's own context, ensuring access to people with specialist expertise and places of scientific interest as part of the school's commitment to learning outside the classroom. Cross curricular opportunities are also identified, were warranted, and planned to ensure contextual relevance – (**Biology** -Unit -Living things and their Habitats-The North Sea – Year 5).

As a school we aim to cultivate a spirit of enquiry through practical exploration and investigation activities both inside and outside the classroom. For example, the children in Year 1 – (Chemistry- Everyday Materials)- know how to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock, this builds on in Year 2 with children performing simple tests to explore questions and find answers, (for example: 'What is the best material for an umbrella?), by Year 5 children build on their knowledge, enabling them to explain that some chemical changes in materials result in the formation of new materials and this kind of change is not usually reversible, including changes associated with burning and acid on bicarbonate of soda. In Biology our younger children in Year 1 identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense, with our oldest pupils being able to identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Identifications of plants and animals with a range of habitats are made (KS1), leading to classification of plants over the year (Year 4).

We teach challenging scientific concepts, meaningful for our children with carefully pitched activities, with complementing videos, diagrams, charts, interactive investigations, ICT and wider text. Supporting every child to achieve. The children are encouraged to understand how science can be used to explain what is occurring, predict how things will behave/change, analyse causes and an understanding of the uses and implications of Science, today and for the future.

Key threads	Biology	Chemistry	Physics	Working scientifically

Science Year 1

	Everyday Materials Chemistry	**Seasons** Physics	**Plants and growth** **Biology**	**Seasons** Physics	**Animals including Humans** **Biology**	**Seasons** Physics
	Why do we teach this? **NC requirement** **How does it build on prior learning?** Children can distinguish between an object and the material from which it is made. They will be able to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock and describe the simple physical properties of a variety of everyday materials. They will also be able to compare and group together a variety of everyday materials on the	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Children will be able to use observation and talk about changes in the weather and the seasons. They learn about the season of Autumn through first hand experiences. They warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Children know how to work scientifically by beginning to make tables and charts about the weather and making displays of what happens between the seasons of	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** Children will be able to Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees in the local environment, and they will have the knowledge to identify and describe the basic structure of a variety of common flowering plants, including trees.	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Children will have the knowledge to make observations and talk about changes in the weather and the seasons. They will be able to study and compare between the seasons of Winter and Spring. Children will learn to work scientifically by adding information they have discovered to their tables and charts about the weather and will add more detail to their Seasons displays explaining what happens between the seasons	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Children will gain the knowledge in identifying and naming 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. They will be able to describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) and will know how to	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Children will have the knowledge to make observations and talk about changes in the weather and the seasons. They will learn about and compare the seasons of Winter and Spring. Children will work scientifically by adding information they have discovered to their tables and charts about the weather and will add more detail to their Seasons displays explaining what

	basis of their simple physical properties. **School Context** - Identify the materials key local buildings are made from and discuss why those materials have been used.	Summer and Autumn and will discover how day length shortens through Autumn. **Children will visit this topic throughout the school year so they have first-hand experience of all the seasons.** **School Context** - Children visit the same areas in the school grounds and locality from Autumn term to draw comparison.	**School Context** - Children will learn about seasonal change in the school grounds (including pond area and forest school area) and local area.	of Summer and Spring and they will have the knowledge of how day length varies between Winter and Autumn and begin to look at day length in other parts of the world. **School Context** Children visit the same areas in the school grounds and locality from Autumn term to draw comparison.	identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **School Context** - Senses discussed and explored within school. What do we see, hear, touch, smell and taste every day? Local area – the school pond and Forest School area	happens between the seasons of Summer and Spring and they will discover how day length varies between Winter and Autumn and begin to look at day length in other parts of the world. **School Context** Children visit the same areas in the school grounds and locality from Autumn term to draw comparison.
	Autumn		**Spring**		**Summer**	
	Year 1 pupils will learn to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:	**Working Scientifically** (WS) 1. asking simple questions and recognising that they can be answered in different ways 2. observing closely, using simple equipment 3. performing simple tests 4. identifying and classifying 5. using their observations and ideas to suggest answers to questions **6.** gathering and recording data to help in answering questions				
	Everyday Materials Chemistry	**Seasons** Physics	**Plants and growth** **Biology**	**Seasons** Physics	**Animals including Human** **Biology**	**Seasons** Physics
	To know how to distinguish between an object and the material from which it is made. **To know how to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.** **To know how to describe the simple physical properties of a variety of everyday materials.** **To know how to compare and group together a variety of everyday materials on the basis of their simple physical properties.** **To know how to perform a simple test to explore questions.** **Working scientifically:** ·Perform simple tests to explore questions, for example: 'What is the	**To know how to observe changes across the season of autumn.** **To know how to observe changes between summer and autumn.** **To know how to observe and describe weather associated with the season of autumn.** **To know how the day length shortens in autumn.** **(To be covered throughout the year)** **Working scientifically:** · Make tables and charts about the weather · Make displays of what happens in the world around them, including day length, as the seasons change. · Observe and talk about changes in the weather and the seasons.	**To know how to identify and name a variety of common wild and garden plants in the local area.** **To know how to identify and name deciduous and evergreen trees in the local area.** **To know how to identify and describe the basic structure of a variety of common flowering plants.** **To know how to identify and describe the basic structure of a variety of common flowering trees.** **Working scientifically:** · Use magnifying glasses, · Draw diagrams · Keep records	**To know how to observe changes in the season of spring.** **To know how to observe changes between winter and spring.** **To know how to observe and describe weather associated with spring.** **To know how day length varies between winter and spring.** **To look at how the day length varies in other parts of the world.** **(To be covered throughout the year)** **Working scientifically:** · Make tables and charts about the weather	**To know how to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.** **To know how to identify and name a variety of common animals that are carnivores, herbivores and omnivores reptiles, birds and mammals.** **To know how to describe the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) , reptiles, birds and mammals.** **To know how to compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) , reptiles, birds and mammals.** **Living things (Human body)**	**To know how to observe changes in the season of summer.** **To know how to observe changes between autumn, winter, spring and summer.** **To know how to compare the weather associated with all four seasons.** To know how the day length varies throughout the year in all four seasons. (To be covered throughout the year) **Working scientifically:** · Make tables and charts about the weather

	best material for an umbrella? … for a shopping bag? … for a fish tank? … for a table? … for their PE kit?' ·Explore, name, discuss and raise and answer questions about everyday materials · Become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent · Explore and experiment with a wide variety of materials including for example: brick, paper, fabrics, elastic, and foil. **Aiming High:** Children will have the knowledge to explain what happens to certain materials when they are heated, e.g. bread, ice, chocolate. Or what happens when they are cooled, e.g. jelly.	· Be aware that it is not safe to look directly at the sun, even when wearing dark glasses. **Aiming High**: Children will have the knowledge to talk about weather variation in different parts of the world.	·Use the local environment to explore and answer questions about plants growing in their habitat. · Observe the growth of flowers and vegetables that they have planted. · Become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures **Aiming High:** Children will have the knowledge to name the parts of flowering plants.	· Make displays of what happens in the world around them, including day length, as the seasons change. · Observe and talk about changes in the weather and the seasons. · Be aware that it is not safe to look directly at the sun, even when wearing dark glasses. **Aiming High**: Children will have the knowledge to talk about weather variation in different parts of the world.	**To know how to identify, name, draw and label the basic parts of the human body.** **To know which part of the human body is associated with each sense.** **Working scientifically**: · Compare using videos and photographs · Group animals according to what they eat · Use their senses to compare different textures, sounds and smells. · Use the local environment to explore and answer questions about animals in their habitat. · Understand how to take care of animals taken from their local environment and the need to return them safely after study. · Become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets. · Learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes. **Aiming High**: Children will have the knowledge to name some parts of the human body that cannot be seen.	· Make displays of what happens in the world around them, including day length, as the seasons change. · Observe and talk about changes in the weather and the seasons. · Be aware that it is not safe to look directly at the sun, even when wearing dark glasses. **Aiming High**: Children will have the knowledge to talk about weather variation in different parts of the world

Science Year 2

	Uses of everyday Materials Chemistry	**Animals including Humans** **Biology**	**Living Things and their Habitats** **Biology**	**Food Chains** **Biology**	**Plants** **Biology**	**Unit to be developed** **Businesses and Manufactures**
	Why do we teach this? **NC requirement** **How does it build on prior learning?** So children will have the knowledge to 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	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Children in Year 2 will build on their prior knowledge in Year 1, they will; understand that animals, including humans, have offspring which grow into adults Describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise,	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** 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,	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Building on from the previous term, Year 2 will deepen their knowledge on Living things and their habitats by exploring the idea that animals obtain their food from plants and other animals. They will use their knowledge to construct simple food chains that include a human (e.g.	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Year 2 children will build on previous knowledge from Year 1. They will: 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.	

	changed by squashing, bending, twisting and stretching. **School Context** Children to compare the uses of everyday materials in and around the school with materials found in other places	eating the right amounts of different types of food, and hygiene. **School Context** Could refer to the school dinner menu; each day is provided from each food group.	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. **School Context** Children observe plants and animals and the conditions they are growing in around the school grounds, including in the pond area and Forest School	grass, cow, human), and identify and name different sources of food. The children will deepen their understanding by making comparisons between different food chains of different animals in the local environment and discuss their findings. **School Context** Could explore the animals within the local area (Barnham Common and the River).	Children observe plants and the conditions they are growing in around the school grounds, including in the edible playground and rooftop garden **School Context** Children observe plants and the conditions they are growing in around the school grounds, including in the pond area and Forest School	

Year 2	Autumn		Spring		Summer	
	Year 2 pupils will learn to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:	**Working Scientifically** (WS) 1. asking simple questions and recognising that they can be answered in different ways 2. observing closely, using simple equipment 3. performing simple tests 4. identifying and classifying 5. using their observations and ideas to suggest answers to questions **6.** gathering and recording data to help in answering questions				
	Uses of everyday Materials **Chemistry**	**Animals including Humans** **Biology**	**Living Things and their Habitats** **Biology**	**Food Chains** **Biology**	**Plants** **Biology**	**To be Developed** **Local Businesses and Manufactures**
	To know how to identify the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. **To know how to compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.** **To know how to find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.** **To know how to work scientifically in comparing the uses of everyday materials in and around the school to materials found in the home.**	**To know that animals, including humans, have offspring which grow into adults.** **To know how to find out about the basic needs of animals, for example, dogs, deer (Thetford forest), and frogs (school pond), for survival (water, food and air).** **To know how to describe the basic needs of animals, for example, dogs, deer (Thetford forest), and frogs (school pond), for survival (water, food and air).** **To know about and describe the basic needs of humans for survival (water, food and air).** **To know and describe the importance of exercise to humans to keep them healthy.** **To know and describe the importance of eating the right amounts of**	**To know how to explore and compare the differences between things that are living, dead, and things that have never been alive.** **To know how to identify that most living things live in habitats to which they are suited .** **To know and describe how different habitats provide for the basic needs of different kinds of animals and plants.** **To know how to identify and name a variety of plants in the local habitat, including microhabitats.** **To know how to identify and name a variety of animals in the local habitat, including microhabitats.** **To know how to do some comparisons between the local**	**To know how animals and plants depend on each other.** **To know how to describe how animals obtain their food from plants and other animals in the local area.** **To Know how to identify and name different sources of food for certain animals.** **To know how to construct a simple food chain for different animals including humans.** **To know how to compare simple food chains of different animals.** **Working scientifically:** · Understand that all living things have certain characteristics that are	**To know and observe how seeds and bulbs grow into mature plants.** **To know and describe how seeds and bulbs grow into mature plants.** **To know the names of the different plants that grow around the school.** **To know that plants need water, light and a suitable temperature to grow and stay healthy.** **To know and describe why plants need water, light and a suitable temperature to grow and stay healthy.** **To know how to work scientifically by observing and recording, with some accuracy the growth of a plant, eg: a runner bean or sunflower.**	

	To know how people have developed useful new materials. **Working scientifically:** · Compare the uses of everyday materials in and around the school with materials found in other places · Observe closely, to identify and classify the uses of different materials, and record their observations. everyday materials and become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass) · Understand the properties of materials that make them suitable or unsuitable for particular purposes. · Think about unusual and creative uses for everyday materials. · Research people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam. **Aiming High**: Children will have the knowledge to describe the different properties of materials using words like, transparent or opaque, flexible, etc.	**different types of food for humans to keep healthy.** **To know that hygiene is important to humans and other animals to keep them healthy and safe – (Link to the common cold and Covid Virus).** **Working scientifically:** · Observe through video or first-hand how different animals, including humans, grow · Ask questions about what things animals need for survival and what humans need to stay healthy · Suggest ways to find answers to their questions Understand the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans · Introduced to the processes of reproduction and growth in animals · Focus on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. · E.g. egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, and adult. **Aiming High**: Children will have the knowledge to explain that animals reproduce in different ways.	**habitat and coastal habitat (North Norfolk Coast)** **Working scientifically:** · Sort and classify things according to whether they are living, dead or were never alive · Record their findings using charts · Describe how they decided where to place things. Explore questions like: 'Is a flame alive? Is a deciduous tree dead in winter?' · Talk about ways of answering their questions · Describe the conditions in different habitats and microhabitats (under log, on stony path, under bushes) Find out how the conditions affect the number and type(s) of plants and animals that live there · Raise and answer questions that help them to become familiar with the life processes that are common to all living things. · Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'microhabitat' (a very small habitat e.g. for woodlice under stones, logs or leaf litter). (Continued next term…)	essential for keeping them alive and healthy · Construct a simple food chain that includes humans (e.g., grass, cow, human) · Raise and answer questions about the local environment. · Identify and study a variety of plants and animals within their habitat and observe how living things depend on each other e.g. plants serving as a source of food and shelter for animals. · Compare animals in familiar habitats with animals found in less familiar habitats, e.g. in the Brecks, in woodland, in the ocean, in the rainforest. **Aiming High:** Children will have the knowledge to describe what animals need to survive and link this to their habitats.	**To know how to set up a comparative test to show that plants need light and water to stay healthy.** **Working scientifically:** · Observe and record, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb · Observe similar plants at different stages of growth; Set up a comparative test to show that plants need light and water to stay healthy · Use the local environment to observe how plants grow. · Understand the requirements of plants for germination, growth and survival and the processes of reproduction and growth in plants. · Know that seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them. **Aiming High**: Children will have the knowledge to explain that plants grow and reproduce in different ways.	
	Science Year 3					
	Materials **Rocks and Soil** **Chemistry**	**Plants** **Biology**	**Animals Including Humans** **Biology**	**Forces and Magnets** Physics	**Light and Shadow** Physics	**To be Developed** **Local Businesses and Manufactors**
	Why do we teach this? **NC requirement** **How does it build on prior learning?** Linked with prior knowledge in geography, Year 3 will Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Building on from Key Stage 1, Year 3 will 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,	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** In Year 3 children will build on their prior knowledge, they will; Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** In Year 3 children will - 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	**Why do we teach this?** **NC requirement** **How does it build on prior learning?** Year 3 will 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	

	how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter **School Context** Refer to story of Mary Anning	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. **School Context** Children observe flowering plants in the pond area and around the school	nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement **School Context** Refer to the school dinner menu; what is the example from each food group on each day?	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. **School Context** Classroom resources that are magnetic - Applying forces of push and pull around the school (gym, school dinners equipment)	to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the size of shadows change. **School Context** Time of day Classroom brightness in relation to productivity	

Science Year 3

	Autumn	Spring	Summer
Year 3 pupils will be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:	**Working Scientifically** (WS) 1. asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests 2. 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 3. 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 4. using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions 5. identifying differences, similarities or changes related to simple scientific ideas and processes 6. using straightforward scientific evidence to answer questions or to support their findings.		

Materials **Rocks and Soils** **Chemistry**	**Plants** **Biology**	**Animals Including Humans** **Biology**	**Forces** Physics	**Light and Shadows** Physics	**To be Developed** **Local Businesses and Manufactors**
To know and research the different kinds of soils and rocks found in the local environment- Link to Flint (Grimes Graves) and chalk (Local area). **To know how to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.** **To know how to describe in simple terms how fossils are formed when things that have lived are trapped within rock.** **To know how to recognise that soils are made from rocks and organic matter.**	**To know how to identify different parts of flowering plants: roots, stem/trunk, leaves and flowers.** **To know how to describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.** **To know how to explore the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) & how they vary from plant to plant.** **To know how to investigate the way in which water is transported within plants, eg: using cut plants in coloured water, children observing how water travels to the flower.**	**To know how to 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.** **To know how to design a healthy meal from researching different food groups.** **To know how to identify that humans have skeletons and muscles for support, protection and movement.** **To know how to identify that other animals have skeletons and muscles for support, protection and movement.**	**To know and compare how things move on different surfaces.** **To know how some forces need contact between 2 objects, but magnetic forces can act at a distance.** **To know how to observe the way magnets attract or repel each other.** **To know how magnets attract some materials and not others.** **To know how to identify and group together a variety of everyday materials on the basis of whether they are attracted to a magnet.**	**To know how to recognise that that light is needed in order to see things and that dark is the absence of light.** **To know how to notice that light is reflected from surfaces.** **To know how to recognise that light from the sun can be dangerous and that there are ways to protect their eyes.** **To know how to recognise that shadows are formed when the light from a light source is blocked by a solid object.**	

	To compare soil from the local area (The Brecks) to the Fenlands and the North Norfolk Coastline. **<u>Work scientifically:</u>** · Observe rocks, including those used in buildings and gravestones exploring how and why they might have changed over time, · Use a hand lens or microscope to help identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. · Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. · Explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. · Raise and answer questions about the way soils are formed. · Explore different kinds of rocks and soils, including those in the local environment (Flint at Grimes Graves-Geography) **<u>Aiming High</u>**: Children will have knowledge to classify igneous and sedimentary rocks.	**To know and begin to explore the idea that plants can make their own food.** **<u>Work scientifically:</u>** · Compare the effect of different factors on plant growth, for example, the amount of light, the amount of fertilizer. · Discover how seeds are formed by observing the different stages of plant life cycles over a period of time; · Look for patterns in the structure of fruits that relate to how the seeds are dispersed. · Observe how water is transported in plants e.g. by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers, the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. · Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens. **<u>Aiming High</u>**: Children will have knowledge to classify a range of common plants according to many criteria (environment found, size, climate required, etc.)	**To know the differences and similarities between the skeletons of animals and humans.** **To know and explore ideas of what would happen if humans didn't have skeletons.** **<u>Work scientifically:</u>** · Identify and group animals with and without skeletons. Observe and compare their movements. · Explore ideas about what would happen if humans did not have skeletons. · Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. · Research different food groups and how they keep us healthy, and design meals based on what they find out. · Continue to learn about the importance of nutrition and introduce the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. **<u>Aiming High</u>**: Children will have knowledge to explain how the muscular and skeletal systems work together to create movement.	**To know how to compare magnetic materials.** **To know how to describe magnets as having 2 poles.** **To know how to predict whether 2 magnets will attract or repel each other, depending on which poles are facing.** **<u>Work scientifically:</u>** · Compare how different things move and group them. Raise questions and carry out tests to find out how far things move on different surfaces. · Gather and record data to find answers to their questions. · Sorting materials into those that are magnetic and those that are not. · Look for patterns in the way that magnets behave in relation to each other and what might affect this, e.g. the strength of the magnet or which pole faces another. Identify how these properties make magnets useful in everyday items, · Suggest creative uses for different magnets. · Observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). · Explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe). **<u>Aiming High</u>**: Children will have knowledge to explore the strengths of different magnets and find a fair way to compare them.	**To know how to find patterns in the way that the size of a shadow changes.** **<u>Work scientifically:</u>** · Look for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes. · Explore what happens when light reflects off a mirror or other reflective surfaces. · Use mirror games to help to answer questions about how light behaves. · Think about why it is important to protect their eyes from bright lights. · Understand that it is not safe to look directly at the sun, even when wearing dark glasses. · Observe and measure shadows, and find out how they are formed and what might cause the shadows to change. **<u>Aiming High</u>**: Children will have knowledge to explain the difference between transparent, translucent and opaque.	

Science Year 4

Materials States of Matter Chemistry	Electricity Physics	Animals including Humans The Digestive System and Teeth Biology	Living Things & their habitats Biology	Sound Physics	To be Developed Local Businesses and Manufactures
Why do we teach this? **NC Requirement** **How does it build on prior learning?** Year 4 will build on prior knowledge of materials in Key Stage 1, They will 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. **School Context** Children make observations during cooking lessons.	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** Children in Year 4 will 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. **School Context** Electrical boxes in school	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** In Year 4, children will build on previous knowledge from Year 3, they will; Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey **School Context** Invite a local dentist in to school	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** In Year 4 children will build on their prior knowledge from Year 2. They will: 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 **School Context** Children observe animals and the habitats they are living in around the school grounds, including in the pond area and Forest School	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** Year 4 will 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 **School Context** Music Room -instruments	

Autumn	Spring	Summer

Year 4 pupils will learn to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

Working Scientifically (WS)

1. asking relevant questions and using different types of scientific enquiries to answer them
2. setting up simple practical enquiries, comparative and fair tests them
3. making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
4. gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
5. recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
6. reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
7. using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
8. identifying differences, similarities or changes related to simple scientific ideas and processes
9. using straightforward scientific evidence to answer questions or to support their findings.

Materials States of Matter Chemistry	Electricity Physics	Animals Including Humans The Digestive System and Teeth Biology	Living Things & their habitats Biology	Sound Physics	To be Developed Local Businesses and Manufactures
To know how to compare and group materials together, according to whether they are solids, liquids or gases.	**To know how to identify common appliances that run on electricity.** **To know how to construct simple series electrical circuits, identify &**	**To know how to describe the functions of the basic parts of the human digestive system.**	**To know how to recognise that living things can be grouped in a variety of ways.** **To know how to explore and use classification keys to help group,**	**To know how to identify how sounds are made, associating some of them with something vibrating.**	

	To know how to 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) **To know how to identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature** **Work scientifically:** · Group and classify a variety of different materials. Explore the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). · Observe and record evaporation over a period of time e.g., a puddle in the playground or washing on a line. Investigate the effect of temperature on washing drying or snowmen melting. · Explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). · Observe water as a solid, a liquid and a gas and note the changes to water when it is heated or cooled. · Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning. **Aiming High**: Children will have knowledge to research the temperature at which materials change state e.g., when iron melts or when oxygen condenses into a liquid.	**name basic parts, inc: cells, wires, bulbs, switches & buzzers.** **To know how to identify whether a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery.** **To know how to recognise that switches open and close a circuit & associate with whether or not a lamp lights in a simple series circuit.** **To know how to recognise some common conductors & insulators and associate metals with being good conductors.** **Work scientifically:** · Observe patterns e.g. that bulbs get brighter if more cells are added, 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. · Construct simple series circuits, · Use different components, for example, bulbs, buzzers and motors, and including switches. · 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). · Children might use the terms current and voltage, but these should not be introduced or defined formally at this stage. · Children should be taught about precautions for working safely with electricity. **Aiming High**: Children will have knowledge to work out which metals can be used to connect across a gap in a circuit.	**To know how to identify the different types of teeth in humans and their simple functions.** **To know how to construct and interpret a variety of food chains, identifying producers, predators and prey.** **Work scientifically:** · Compare the teeth of carnivores and herbivores and suggest reasons for differences. · Research what damages teeth and how to look after them. · Draw and discuss their ideas about the digestive system and compare them with models or images. Begin to know the main body parts associated with the digestive system, e.g.: mouth, tongue, teeth, oesophagus, stomach, and small and large intestine. · Explore questions that help them to understand the special functions of these body parts. Challenge: Pupils can explain how certain living things depend on one another to survive.	**identify and name a variety of living things in their local and wider environment.** **To know how to recognise that environments can change and that this can sometimes pose dangers to living things.** **Work scientifically:** · Use and make simple guides or keys to explore and identify local plants and animals. · Make a guide to local living things. · Raise and answer questions based on observations of animals and what they have found out about other animals that they have researched. · Use the local environment to raise and answer questions that help to identify and study plants and animals in their habitat. · Identify how the habitat changes throughout the year. · Explore possible ways of grouping a wide selection of living things that include animals, flowering plants and non-flowering plants. · Begin to put vertebrate animals into groups, e.g.: fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. Understand that plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, e.g. ferns and mosses. · Explore examples of human impact (both positive and negative) on environments, e.g., the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. **Aiming High**: Children will have knowledge to research the work of pioneers in classification e.g. Carl Linnaeus.	**To know how to recognise that vibrations from sounds travel through a medium to the ear.** **To know how to find patterns between the pitch of a sound and features of the object that produced it.** **To know how to find patterns between the volume of a sound and the strength of the vibrations that produced it.** **To know how to recognise that sounds get fainter as the distance from the sound source increases.** **Work scientifically:** · Find patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. · Make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. · Make and play their own instruments by using what they have found out about pitch and volume. Explore and identify the way sound is made through vibration in a range of different musical instruments from around the world. · Find out how the pitch and volume of sounds can be changed in a variety of ways. Explore and identify the way sound is made through vibration in a range of different musical instruments from around the world. · Find out how the pitch and volume of sounds can be changed in a variety of ways. **Aiming High**: Children will have knowledge to work out which materials give the best insulation for sound and explain why.	

Year 5 Science

Properties and changes of materials Chemistry	Animals, including Humans Biology	Forces Physics	Living Things and their Habitats Biology	Space Physics	To be Developed Local Businesses and Manufactures
Why do we teach this? **NC Requirement** **How does it build on prior learning?** Following on from knowledge in Year 4, Year 5 will 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 **School Context**	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** Building on prior knowledge from Year 4, they will describe the changes as humans develop to old age. describe the changes as humans develop to old age. They will learn about the changes experienced in puberty. They will work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows. **School Context** Year 5 RSE Unit on Puberty	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** In Year 5 children will build on prior knowledge on their work on forces in Year 3. They will 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. **School Context**	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** Year 5 children will develop their knowledge. They will 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. **School Context** Children observe animals in the pond area and around the school	**Why do we teach this?** **NC Requirement** **How does it build on prior learning?** In Year 5 children will 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. **School Context**	

Science Year 5

Autumn	Spring	Summer

	Year 5 pupils will learn to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:	**Working Scientifically** (WS) 1. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary 2. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate 3. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 4. 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 5. identifying scientific evidence that has been used to support or refute ideas or arguments

Properties of Changes of Materials **Chemistry**	**Animals Including Humans** **Biology**	**Forces** Physics	**Living Things and their Habitats** **Biology**	**Earth and Space** Physics	**To be Developed Local Businesses and Manufactures**
To know how to 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. **To know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.** **To know how to use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.** **To know how to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.** **To know how to demonstrate dissolving, mixing & changes of state are reversible changes.** **To know how to explain that some changes result in the formation of new materials and this kind of change is not usually reversible, including changes associated with burning and acid on bicarbonate of soda.** **<u>Working scientifically:</u>**	**To know how to describe the changes as humans develop to old age.** **To know how to draw a timeline to indicate stages in the growth of humans.** **To know how to draw a timeline to indicate stages in the development of humans.** **To know about the changes experienced during puberty.** **To know how to research the gestation periods of other animals including deer, dogs and seals. (local link with Breckland and North Sea).** **<u>Working scientifically:</u>** · Research the gestation periods of other animals and compare them with humans. · Find out and record the length and mass of a baby as it grows. · Draw a timeline to indicate stages in the growth and development of humans. · Learn about the changes experienced in puberty. **<u>Aiming High</u>**: Children will have knowledge to create a timeline to include stages of growth	**To know how unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Including scientists, Sir Isaac Newton and Galileo theory of gravitation).** **To know how to identify the effects of air resistance that act between moving surfaces.** **To know how to identify the effects of water resistance that act between moving surfaces.** **To know how to identify the effects of friction that act between moving surfaces.** **To know how to recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.** **To know how to test that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.** **<u>Working scientifically:</u>** · Explore falling paper cones or cupcake cases. · Design and make a variety of parachutes. · Carry out fair tests to determine which designs are the most effective.	**To know how to describe the life cycles of a mammal, an amphibian, an insect and a bird.** **To know how to make comparisons between the life cycles of a mammal, an amphibian, an insect and a bird.** **To know how to describe the life process of reproduction in some plants.** **To know how to describe the life process of animals.** **To know how to research the work of naturalists and animal behaviourists including Sir David Attenborough and Jane Goodall.** **<u>Working scientifically</u>**: · Observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times). · Ask relevant questions and suggest reasons for similarities and differences. · Grow new plants from different parts of the parent plant e.g. seeds, stem and root cuttings, tubers, bulbs. Observe changes in an animal	**To know how to describe the movement of The Earth and other planets in the Solar System relative to the sun.** **To know how to describe the movement of the moon relative to The Earth.** **To know how to describe the Sun, Earth and moon as approximately spherical bodies.** **To know how to use the idea of the Earth's rotation.** **To know how to explain day and night.** **To know how to explain the apparent movement of the sun across the sky.** **<u>Working scientifically:</u>** · Compare the time of day at different places on the Earth through internet links and direct communication. Create simple models of the solar system. · Construct simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day. · Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks.	

	· Carry out tests to answer questions e.g. 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' · Compare materials in order to make a switch in a circuit. · Observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. · Research and discuss how chemical changes have an impact on our lives e.g. cooking. · Discuss the creative use of new materials such as polymers, sup er-sticky and super-thin materials. · Build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. · Explore reversible changes, including evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. · Explore changes that are difficult to reverse e.g. burning, rusting and other reactions e.g. vinegar with bicarbonate of soda. Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. **Safety guidelines should be followed when burning materials.** **<u>Aiming High</u>**: Children will have knowledge to find out about how chemists create new materials, e.g. Spencer Silver, who	in certain animals, such as frogs and butterflies	· Explore resistance in water by making and testing boats of different shapes. · Design and make products that use levers, pulleys, gears and/or springs and explore their effects. · Explore falling objects and raise questions about the effects of air resistance. · Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. · Experience forces that make things begin to move, get faster or slow down. · Explore the effects of friction on movement and find out how it slows or stops moving objects e.g. by observing the effects of a brake on a bicycle wheel. · Explore the effects of levers, pulleys and simple machines on movement. **<u>Aiming High</u>**: Children will have knowledge to research how scientists e.g. Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	over a period of time (e.g. by hatching and rearing chicks), · Compare how different animals reproduce and grow. · Study and raise questions about the local environment. · Observe life-cycle changes in a variety of living things e.g. plants in the vegetable garden or flower border, and animals in the local environment. · Research the work of naturalists and animal behaviourists e.g. David Attenborough and Jane Goodall. **<u>Aiming High</u>**: Children will have knowledge to research different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.	· Introduce a model of the sun and Earth that enables children to explain day and night. · 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). · 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). **<u>Aiming High</u>**: Children will have knowledge to research 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.	

	invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton					
Year 6	**Year 6 Science**					
	<u>Light</u> Physics	**<u>Electricity</u>** Physics	**<u>Animals including Humans</u> Biology**	**Classification (Living Things) Biology**	**<u>Living Things and their Habitats Evolution and inheritance</u>** Biology	**To be Developed Local Businesses and Manufactures**
	<u>Why do we teach this?</u> **NC Requirement** **<u>How does it build on prior learning?</u>** Building on prior knowledge from Year 3, Year 6 will 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. **<u>School Context</u>** Children use the playground - shadows	**<u>Why do we teach this?</u>** **NC Requirement** **<u>How does it build on prior learning?</u>** In Year 6 children will 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. **<u>School Context</u>** Electrical boxes in school	**<u>Why do we teach this?</u>** **NC Requirement** **<u>How does it build on prior learning?</u>** Year 6 children will build on their prior knowledge from previous years, They will 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. - (see also Evolution and inheritance) **<u>School Context</u>** Link to PE lessons	**<u>Why do we teach this?</u>** **NC Requirement** **<u>How does it build on prior learning?</u>** Year 6 will 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. They will give reasons for classifying plants and animals based on specific characteristics. **<u>School Context</u>** Children observe animals and flowering plants in the pond area and around the school.	**<u>Why do we teach this?</u>** **NC Requirement** **<u>How does it build on prior learning?</u>** Children in Year 6 will build on their prior knowledge about fossils in Year 3, They will: 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. Children will 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. **<u>School Context</u>**	
	<u>Science Year 6</u>					

Y6	Autumn	Spring	Summer

	Year 6 pupils will learn to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:	**<u>Working Scientifically</u>** (WS) • 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.

Light Physics	**Electricity** Physics	**Animals including Humans** **Biology**	**Classification (Living Things)** **Biology**	**<u>Living Things and their Habitats</u> Evolution and inheritance** **Biology**	**To be Developed Local Businesses and Manufactures**
To know how to recognise that light appears to travel in straight lines. **To know how to 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.** **To know how to 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.** **To know how to use the idea, light travels in straight lines to explain why shadows have the same shape as objects.** **<u>Working scientifically:</u>** · Decide where to place rear-view mirrors on cars. · Design and make a periscope and use the idea that light appears to travel in straight lines to explain how it works. · Investigate the relationship between light sources, objects and shadows by using shadow puppets. · Build on knowledge of light from year 3. · Explore the way that light behaves, including light sources, reflection and shadows. · Discuss observations and make predictions.	**To know how to associate the brightness of a lamp or the volume of a buzzer with the number & voltage of cells in the circuit.** **To know how to compare and give reasons for variations in how components function, including brightness of bulbs, the loudness of buzzers and the on/off position of switches.** **To know how to use recognised symbols when representing a simple circuit in a diagram.** **<u>Working scientifically:</u>** · Systematically identify the effect of changing one component at a time in a circuit. · Design and make a set of traffic lights, a burglar alarm or some other useful circuit. Build on their knowledge of electricity from year 4. · Construct simple series circuits, to help them to answer questions about what happens when they try different components e.g. switches, bulbs, buzzers and motors. · Learn how to represent a simple circuit in a diagram using recognised symbols. Note: Pupils are expected to learn only about series circuits, not parallel circuits.	**To know how to identify and name the main parts of the human circulatory system.** **To know and describe the functions of the heart, blood vessels & blood.** **To know how to recognise the impact of diet and exercise on the body.** **To know how drugs and lifestyle can impact the way our bodies function.** **To know how to describe ways in which nutrients and water are transported within animals, including humans.** **<u>Working scientifically:</u>** Explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health. · Build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system). · Explore and answer questions about how the circulatory system enables the body to function. · Understand how to keep their bodies healthy. · Understand how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.	**To know how to describe how living things are classified into broad groups according to common observable characteristics, based on similarities & differences, in micro-organisms, plants & animals.** **To know and give reasons for classifying plants and animals based on specific characteristics** **To know and give reasons for classifying animals based on specific characteristics** **<u>Working scientifically:</u>** · Use classification systems and keys to identify some animals and plants in the immediate environment. · To research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system. · Build on their knowledge of grouping living things in year 4 by looking at the classification system in more detail. · Introduce the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. · Make direct observations where possible. · Classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and	**To know how to recognise that living things have changed over time.** **To know how fossils provide information about living things that inhabited the Earth millions of years ago.** **To know how to recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.** **To know how to identify how animals are adapted to suit their environment.** **To know how to identify how plants are adapted to suit their environment.** **<u>Working scientifically:</u>** · Observe and raise questions about local animals and how they are adapted to their environment. · Compare how some living things are adapted to survive in extreme conditions e.g. cactuses, penguins and camels. 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.	

	Aiming High: Children will have knowledge to extend their experience of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters (they will not need to explain why these phenomena occur).	**Pupils should be taught to take the necessary precautions for working safely with electricity.** **Aiming High**: Children will have knowledge to explain the dangers of short circuits and why they occur.	**Aiming High**: Children will have knowledge to make a diagram of the human body that outlines the main parts and explain how the different parts work and depend on one another	vertebrates (fish, amphibians, reptiles, birds and mammals). · Discuss reasons why living things are placed in one group and not another. **Aiming High**: Children will have knowledge to research the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.	· Build on knowledge of fossils from rocks in year 3. Find out more about how living things on earth have changed over time. · Understand the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when e.g. Labradors are crossed with poodles. · Understand that variation in offspring over time can make animals more or less able to survive in particular environments e.g. by exploring how giraffes' necks get longer, or the development of insulating fur on the arctic fox. · Research the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. **Note**: Pupils are not expected to understand how genes and chromosomes work. **Aiming High**: Children will have knowledge to analyse the advantages and disadvantages of specific adaptations, such as being on two rather than four feet.	

RFS Planning & Progression: Science

Science & The Foundation Stage

Three and Four-Year-Olds Range 5	Communication and Language	· Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
	Personal, Social and Emotional Development	• Make healthy choices about food, drink, activity and tooth-brushing.

Three and Four-Year-Olds Continued	Physical Development	· Sing songs that require movement, and use the names of body parts: Heads, Shoulders , knees and toes.
	Understanding the World	· Use all their senses in hands-on exploration of natural materials. · Explore collections of materials with similar and/or different properties. · Talk about what they see, using a wide vocabulary. · Begin to make sense of their own life-story and family's history. · Explore how things work. · Plant seeds and care for growing plants. · Understand the key features of the life cycle of a plant and an animal. · Begin to understand the need to respect and care for the natural environment and all living things. · Explore and talk about different forces they can feel. · Talk about the differences between materials and changes they notice.
Reception Range 6	Communication and Language	• Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. · Use new vocabulary in different contexts.

	Personal, Social and Emotional Development		Know and talk about the different factors that support their overall health and wellbeing: · regular physical activity · healthy eating · tooth-brushing · sensible amounts of 'screen time' · having a good sleep routine · being a safe pedestrian
	Physical Development		· Sing songs that require movement (balance …) and use the names of body parts: 'Heads, Shoulders , knees and toes'. · Join in some Yoga sessions, stretching and focusing on and naming different parts of the body. · 'Simon says' – stretch your arms up to the sky… balance on one leg…
	Understanding the World		· Explore the natural world around them. (i.e. talking about different materials) · Describe what they see, hear and feel while they are outside. · Recognise some environments that are different to the one in which they live. · Understand the effect of changing seasons on the natural world around them.

ELG	Communication and Language	Listening, Attention and Understanding	Make comments about what they have heard and ask questions to clarify their understanding.
		Speaking	Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Self-Regulation	To comment on their breathing and how quick or slow their heart is beating depending on how they are feeling: calm, angry, upset
		Managing Self	Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
		Building Relationships	Comment on their emotions while building relationships.

	Physical Development	Gross Motor Skills	· Catching and throwing a ball - making children aware of eye /hand co-ordination · Using different parts of their bodies to move around · Pushing and pulling toys (forces)
	Understanding the World	Past and Present	· Explore the natural world around them, making observations and drawing pictures of animals and plants. · Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. · Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.