Science Subject Leaders' Sequence and Progression Document

INTRODUCTION

The purpose of this document is to outline the approach and method that has been adopted to implement the science curriculum at St. Andrew's. It sets out what we aim to achieve and the knowledge and understanding that we have apportioned to each class and key stage. The decisions made have been done so by reference to the school's *Mission Statement*, the staff and Governing Body's vision for the future of our school. This document summarises the organisation of the science curriculum and the school's method of securing children's entitlement to essential knowledge and skills to equip them for the next stage of their education and for later life.

AIMS

- To ensure standards remain high and English and Maths is taught discretely
- To ensure reading remains a high priority
- To utilise the rich resource and history of our local community of Boothstown
- To support our school's values and ethos
- To ensure pupils leave as 'well rounded' and confident individuals
- To ensure the wider sports curriculum and the arts are a key focus

LIFESKILLS WE DEVELOP

- Resilience
- Assertiveness and confidence
- Self esteem
- Communication skills
- Social skills
- Coping skills
- Stress management
- Problem solving
- Emotional awareness

END POINTS IN THE CURRICULUM

At St. Andrew's, we provide the children with the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. We want our science curriculum to develop in all young people, a lifelong curiosity and interest in the sciences. Our children teaches essential aspects of the knowledge, methods, processes and uses of science. By building up a body of key foundation knowledge and concepts, children will recognise the power of rational explanation and they will have a sense of excitement and curiosity about science. Children will understand how science can explain what is occurring, predict how things will behave, and analyse causes.

INTENT

Knowledge and skills St Andrew's wants our pupils to achieve at each stage

In our rapidly evolving world, science is a vital part of our curriculum. We intend our children to have the opportunity to learn through varied systematic investigations, leading to them being equipped for life to ask and answer scientific questions about the world around them. As children progress through the year groups, they build on their skills in working scientifically, as well as on their scientific knowledge. They develop greater independence in planning and carrying out fair and comparative tests to answer a range of scientific questions. Science lessons at St. Andrew's engage learners at many levels. We want children to be eager to learn new knowledge and in turn, remember this key knowledge. Staff have produced knowledge organisers for each science topic, which are used to help reinforce the key knowledge for each unit as set out in the science national curriculum. The science knowledge organisers help children to consolidate and retain the science knowledge they have learnt and also reinforce key scientific vocabulary from each unit. Teachers are aware of previous learning in each of the science topics, which allows them to check up on children's previous knowledge and retention at the beginning and throughout each science topic. Pupils learn to question and discuss science-based issues that may affect their own lives, the direction of society and the future of the world.

At St. Andrew's, our science curriculum is varied, progressive and well-mapped-out. It provides the opportunity for progression across the full breadth of the science national curriculum for KS1 and KS2. Throughout EYFS, KS1 and KS2, children are exposed to and are taught a vast range of scientific vocabulary.

Scientific skills and learning begin in EYFS at St. Andrew's. Children are taught about how to stay healthy and are encouraged to explore the natural world around them. They are encouraged to describe what they see, hear and feel when they are outside. They observe the changing seasons, which provides them with a foundation of observation and knowledge for science learning in KS1. Children in EYFS make comments about what they have heard and are encouraged to ask questions. Children observe animals and plants in their environment. This is then built upon throughout KS1 and KS2. Children learn and observe changing states of matter, again preparing them for future science learning in KS1 and KS2.

At Key Stage 1, pupils ask simple questions, observe closely, identify and classify. They begin to work together to collect evidence to help them answer questions and to link this to simple scientific ideas. Children understand that questions can be answered in different ways. Pupils use simple equipment and perform simple tests to answer questions, using their observations. They share ideas and communicate them using scientific language, drawings, charts and tables.

In Lower Key Stage 2, the skills children have acquired in Key Stage 1 are built upon and expanded. Children are introduced to fair testing and understand the importance of it. They continue to use practical science equipment to take accurate measurements. They gather and present their data in a variety of ways to answer scientific questions. Children in LKS2 are able to draw simple conclusions and make predictions. They are taught to analyse their work and suggest improvements. They use scientific evidence to answer questions and are able to identify differences, similarities and changes.

In Upper Key Stage 2, children's skills are built upon again and expanded even further. Children are introduced to variables and use controlling variables, where necessary. They continue to take accurate measurements and repeat readings, where appropriate. They record data and results in a wide variety of ways, such as diagrams, labels, classification keys, tables, scatter graphs, bar and line graphs. They continue to improve their prediction skills and set up comparative and fair tests. By the time children are in UKS2, they are able to see the 'bigger picture' of science. They understand that scientific evidence can be used to support or refute ideas or arguments.

How we will build towards those end points

We build towards these end points by ensuring that our teaching is high quality.

- Vocabulary is given a high priority through the school.
- Working scientifically skills are built upon as children progress through the school.
- The coverage of our curriculum is excellent. This can be evidenced by looking at MTPs and the children's books.
- Teachers use a range of resources to reinforce understanding. Teachers ensure that the resources they use are accurate and support their teaching effectively.
- Teaching assistants support science learning.
- Teachers at St. Andrew's have excellent subject knowledge, which allows our science curriculum to be progressive and ensures that children are challenged. Because the teachers in every year group know what has been taught before and what will be taught in the future (subject leader devised a knowledge matrix that covers EYFS - > KS3), teachers have an excellent understanding of how their particular science topic being taught progresses. This informs how we teach different aspects of science knowledge and skills.
- Teachers model scientific thought processes to the children. This helps the children to work scientifically and consider a variety of explanations and causes.
- Teachers have received high quality science CPD from a science expert.
- We ensure that the children are taught about significant scientists and inventors. We teach them that scientists are always making new discoveries and that science can explain how and why things occur. This motivates the children and helps them to appreciate the importance of science in the wider world. Teachers questioning during lessons gets the children thinking.
- Maths skills are transferred well to science lessons.
- Teachers deliver their lessons in a manner that sparks curiosity.
- Between partner classes, teaching and coverage is consistent.
- Teachers ensure that children's work in their books is of high quality.
- Children complete regular 'quick quizzes' in class and a pre and post quiz for each science topic. This assessment allows children to fill gaps and repeat certain aspects of the science curriculum, if necessary.
- Teachers help the children to build resilience.
- The National Curriculum informs the knowledge and skills we teach. As the science National Curriculum is hierarchical, the topics we teach are already placed into year groups for us. Teachers have worked with their partner teacher to plan 6 lessons per science topic. These 6 lessons show progression and incorporate working scientifically skills, as well as children being taught the appropriate science knowledge.
- The Long Term Plan is continually reviewed by the subject leader and senior leaders to ensure that our science curriculum is well organised and delivered well.

<u>How is science planned and sequenced so that new knowledge and skills build on what has been taught before</u>

Staff members have worked together in staff meetings to ensure that the curriculum is sequenced and is progressive. Partner teachers have written medium term plans together and have also written quizzes and knowledge organisers. The science coordinator has produced a document that shows staff the progression of science knowledge from Early Years up to Key Stage 3. This gives teachers a good overview of the knowledge and vocabulary taught by topic and use this to refer to. The long term plan is continually checked by the leadership team and the science coordinator. The long term plan demonstrates that our curriculum is

sequenced well and is progressive. The medium term plan templates were pre populated with progressive scientific skills for each year group for the teachers to refer to.

How it reflects the local context

Science topics are planned to make the most of our local environment. For example, Seasonal Changes (Year 1) is taught when there is a seasonal change occurring (Spring -> Summer). When Plants is taught in Year 1, Year 2 and Year 3, teachers make the most of our school grounds in their teaching. Similarly, teachers make use of the local environment when teaching Living things and their Habitats. Year 5 visit RHS Bridgewater, which is on our doorstep, as part of their science curriculum and have opportunities to see the work of scientists and botanists first hand. Classes have been on trips to Chester Zoo, Knowsley Safari Park, Imagine That! and the Museum of Science and Industry, as part of their science learning. We have had a careers day, where children got to discuss STEM careers with professionals. Moreover, we make use of a local science expert, Adrian Bowden, who has delivered training and science shows. He is also a lecturer at the University of Manchester for PGCE students.

CULTURAL CAPITAL

Children's cultural capital is developed in a number of ways.

- Retention of knowledge
- Learning about significant scientists and inventors
- Reading is given high priority
- High quality teaching
- British values given high priority
- Skills taught in maths are transferable to science
- Skills taught in science are transferable to real life situations and future learning
- Science experiences
- Trips
- Visitors to school (for example, Adrian Bowden, history workshops, Drumz Aloud, cricket coaches etc)
- Using ICT where appropriate
- Children develop a love of science

IMPLEMENTATION

The acquisition of key scientific knowledge is an integral part of our science lessons. Linked knowledge organisers enable children to learn and retain the important, useful and powerful vocabulary and knowledge contained within each unit. The progression of skills for working scientifically are developed through the year groups and scientific enquiry skills are of key importance within lessons. The progression of these skills is shown at the bottom of our medium term plans. Each lesson has a clear focus. Scientific knowledge and enquiry skills are developed with increasing depth and challenge as children move through the year groups. They complete investigations and hands-on activities while gaining the scientific knowledge for each unit. Teachers are continually assessing children's levels of understanding by using verbal quizzes at various points in children's learning and lessons. This is in addition to the pre and post knowledge quizzes that are in the children's books. The sequence of lessons helps to embed scientific knowledge and skills, with each lesson building on previous learning. Our teachers have excellent subject knowledge, which enables them to deliver high-quality teaching and learning opportunities.

CPD/Research

Staff have had many science CPD opportunities. We have had a number of staff meetings dedicated to science over the past few years, which have focused on Working Scientifically skills progression and knowledge retention.

Science medium term plans were written by staff during staff meeting time, which allowed staff to liaise with each other and discuss ideas. This was particularly helpful for staff, as they were able to liaise with teachers from other year groups which allowed them to have a better understanding of previous and subsequent science learning. Knowledge organisers and retrieval quizzes were also written during staff meeting time.

In 2019, we had an INSET day led by science expert, Adrian Bowden. This focused on Working Scientifically skills and also on knowledge retention. Teaching assistants attended this, as well as teachers.

Adrian Bowden visits St. Andrew's yearly, delivering science shows to KS1 and KS2 children. This is part of staff CPD, as they observe Adrian teaching, gaining ideas of how to teach a range of science topics.

The science subject leader is given a morning out of class to conduct a learning walk. This includes observing lessons, looking at books and speaking to children.

The science subject leader has taken part in a STEM project, ran by STEM Learning. This has ensured that the science coordinator has a better understanding of science across the whole school and has informed the science coordinator about the latest science research and thinking.

St. Andrew's are part of the Worsley cluster of schools. We hold regular science subject leader meetings. Our science coordinator has chaired some of these meetings.

How are key concepts taught?

Key concepts are taught as part of the everyday science teaching. Teachers in each year group have picked out approximately 10 key concepts/facts they want the children to remember. These are given to the children in the form of a knowledge organiser and are continually revised with the children. The knowledge of these key concepts/facts are tested using our retrieval quizzes. Key skills are taught through carrying out investigations. As well as children taking part in investigations, teachers also explicitly teach the children working scientifically skills. Working scientifically skills are not a by-product of 'doing' and teachers are aware of this.

How do teachers check understanding and correct misunderstandings?

At the start of each science topic, teachers assess previous science learning. They do this through the use of verbal quizzes. Teachers know what has been taught before in each science topic, as they have been provided with a document that shows all knowledge taught per topic. This also shows ELGs and KS3 knowledge.

Teachers check understanding through formative and summative assessments, marking, retrieval quizzes and the use of Target Tracker. Teachers pre-empt misconceptions. When misunderstandings arise, teachers address these quickly and offer additional explanations. This has been seen when the science coordinator has observed science lessons across the school.

How do teachers embed key concepts to long term memory?

This is done by regular quick quizzes and formal retrieval quizzes. Teachers also get the children to retrieve knowledge from previous year groups/previous topics – this is often done verbally.

How has the design of your curriculum ensured knowledge is transferred to long term memory?

Our curriculum used to be cross curricular. We have worked very hard over the past few years to design a curriculum where subjects are taught discretely. Our long term plan ensures that children build upon their previous knowledge and skills. Knowledge organisers have been designed by staff to ensure that key learning is embedded to long term memory. Our MTPs highlight key knowledge that we want the children to learn. This is continually repeated and shared with the children and parents.

How do you use assessment information?

Teachers use a mixture of formative and summative assessment to assess children. Teachers assess the children half-termly against a set of NC statements on Target Tracker. Teachers highlight whether each child is working towards each statement or achieved each statement. After this, teachers assess the children on Target Tracker using steps – this highlight which children are working towards, working at expected or working above. This assessment data is then analysed by the science coordinator termly. The science coordinator checks assessment and progress in each year group and makes notes about Pupil Premium children, disadvantaged children, SEN children and boys vs. girls. This analysis is shared with the management team. Teachers use assessment information to inform future planning and plug gaps where necessary, especially since the Covid 19 pandemic.

IMPACT

Our science curriculum is high quality, well thought out and is planned to ensure progression. Our progress is measured through a child's ability to know more, remember more and explain more. This is evidenced through our consistently high attainment results. Progress is consistent across the school (6 steps at least). When speaking to children about their learning, it is clear that they are able to retrieve knowledge and show a good understanding of what they have learned. Looking at books, it is clear that children produce excellent work that demonstrates their high-quality learning.

SEN children are sometimes below age-related expectation but do make similar progress. We have very few disadvantaged children at St. Andrew's. They make good progress in science.

Children at St. Andrew's are well prepared for the next stage of their education. We prepare the children well for Year 7, as part of the Year 6 transition process. Our yearly science shows help to develop the children's love of science. Staff in every year group prepare their classes for the next stage of their education through high quality teaching and discussions with colleagues. We have open mornings for parents of children who are transitioning to the next key stage. Our reading and maths attainment is consistently high. This allows children to attain highly in science.

Coordinator Long Term Plan

<table>
<tr><th colspan="7">Science Long Term Plan</th></tr>
<tr><th>Subject</th><th>Autumn 1</th><th>Autumn 2</th><th>Spring 1</th><th>Spring 2</th><th>Summer 1</th><th>Summer 2</th></tr>
<tr><td></td><td colspan="6">Understanding the World
Natural World</td></tr>
<tr><td>N
3-4</td><td colspan="6">Natural material, similar and/or different properties.
Talk about what they see using a wide vocabulary
Explore how things work.
Plant seeds and care for growing plants.
Key features of the life cycle of a plant and an animal.
Natural environment and all living things.
Forces they can feel.
Natural environment and all living things</td></tr>
<tr><td>Rec</td><td colspan="6">Natural world around them
See, hear and feel whilst outside
Changing seasons on the natural world around them
Some environments that are different to the one in which they live.</td></tr>
<tr><td>Y1</td><td>Animals including humans</td><td></td><td></td><td>Materials</td><td>Seasonal Changes</td><td>Plants</td></tr>
<tr><td>Y2</td><td></td><td>Animals including humans</td><td>Material changes and uses</td><td></td><td>Plants</td><td>Habitats</td></tr>
</table>

Y3	Forces	Animals including humans	Plants	Fossils, rocks and soils	Fossils, rocks and soils	Light and shadows
Y4	Teeth	Electricity	States of matter Water cycle	Sound	Habitats	
Y5	Earth and Space		Properties and changes of materials		Forces	Animals incl humans (growing old) Living things and their habitats
Y6	Light	Electricity	Living things and their habitats	Evolution	Animals including humans	Animals including humans

Content Summary

National Curriculum Content – Science (Substantive Knowledge)	
EY	Understanding the World
	The Natural World
3-4	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 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. Begin to understand the need to respect and care for the natural environment and all living things
Rec	Explore the natural world around them Describe what they see, hear and feel whilst outside Understand the effect of changing seasons on the natural world around them 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. Understand the effect of changing seasons on the natural world around them

KS1	Coverage	Autumn	Spring	Summer
	NC Skills	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: 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.		
Y1	NC Content	**<u>Ourselves (inc animals)</u>** 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	**<u>Materials</u>** 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	**<u>Seasonal Changes</u>** observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies. <u>Plants</u> Identify and name a variety of common wild and green plants, including deciduous and every day trees.

		(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.	compare and group together a variety of everyday materials on the basis of their simple physical properties.	Identify and describe the basic structure of a variety of common flowering plants including trees.
Y2	NC Content	**Animals (inc 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	**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. **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.	**Living Things & 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 micro-habitats 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.

KS2	Coverage	Autumn	Spring	Summer
	NC Skills	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: 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. During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: 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.		
Y3	NC Content	**Forces** compare how things move on different surfaces	**Plants** identify and describe the functions of different parts of flowering	**Light and Shadows** recognise that they need light in order to see things and that dark is the absence of light

		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. **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.	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. **Fossils, rocks and soils** 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.	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 a solid object find patterns in the way that the size of shadows change.
Y4	NC Content	**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.	**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. **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.	**Water cycle** identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. **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. **Animals including humans**. Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and pray.
Y5	NC Content	**Earth and Space** describe the movement of the Earth, and other planets, relative to the Sun in the solar system	**Properties and changes of materials** compare and group together everyday materials on the basis of	**Living things and their habitats** describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

		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.	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. **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.	describe the life process of reproduction in some plants and animals. **Animals including humans** describe the changes as humans develop to old age.
Y6		**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. **Electricity** associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit	**Living things and their habitats** describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics. **Evolution** 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	**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.

		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.	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.	

Skills (Disciplinary Knowledge)					
YEAR 1	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**	**YEAR 6**
SCIENCE					
Questioning					
*Begin to ask simple questions in order to explore the world around them.	*Ask simple questions in order to explore the world around them. *Ask people questions and use simple secondary sources of information to find answers. *Recognise that scientific questions can be answered in different ways	*Ask relevant questions and using different types of scientific enquiries to answer them.	*Ask relevant questions and make own decisions about the most appropriate type of scientific enquiry they might use to answer questions.	*Explore ideas and raise different kinds of questions. *Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions.	*Plan different types of scientific enquiries to answer questions, including recognising and identifying controlling variables where necessary. *Raise different types of questions.
Investigating					
*Observe and begin to describe simple events, simple features to compare objects, materials and living things *With help, decide how to sort and group materials *Observe changes over time *With guidance, begin to notice patterns and relationships. *With support, perform simple tests and begin to experience different types of investigations to answer questions *Use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests	*Gather data including observations and simple measurements to help in answering questions *Perform simple tests * Identify and classify, using features to compare objects, materials and living things * Decide how to sort and group objects, materials and living things *Use simple equipment to gather data and carry out simple tests * Use of standard measurement	*Set up simple practical enquiries * Begin to make systematic and careful observations and, where appropriate, take accurate measurements, using a range of equipment *With help begin to look for patterns and naturally occurring relationships	*Set up simple practical enquiries, comparative and fair test *Recognise when a simple fair test is necessary and help to decide how to set it up. *Talk about criteria for grouping, sorting and classifying; and use simple keys. *Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data logger. *Make decisions about what observations to make and the type of equipment that might be used	*Take measurements, using a range of scientific equipment, with increasing accuracy and precision *Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why *Make decisions about what observation to make and how to measure	*Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate *Use test results to make predictions to set up further comparative and fair tests *Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why *Make decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately
Presenting evidence					
*With support, record data and observations, communicating their	*With help, they should record and communicate their findings in a range of	*Record findings using simple scientific language, drawings, labelled	*Begin to gather, record, classify and present data in a variety of ways to	*Record data and with support record results of increasing complexity using	*Record data and results using scientific diagrams and labels, classification keys,

findings in a range of ways.	ways and begin to use simple scientific language (key words). *Record simple data.	diagrams, keys, bar charts, and tables. *Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. *Use scientific language.	help in answering questions. *Begin to look for naturally occurring patterns and relationships and decide what data to use. *Use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.	scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. *Begin reporting and presenting findings from enquiries, including conclusions, in oral and written forms such as displays and other presentations. *Begin to decide how to record data.	tables, scatter graphs, bar and line graphs. *Report and present findings, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such presentations. *Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.
Evaluating					
*Ask people questions and use simple secondary sources to find answers. *Talk about what they have found out.	*Use their observations and ideas to suggest answers to questions. *Observe changes over time, notice and, with support, begin to describe patterns and relationships *Talk about what they have found out, beginning to use scientific language.	*With support use straightforward scientific evidence to answer questions or to support their findings. *Use secondary sources to support their ideas. *Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions *With support, identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.	*With help, look for changes, patterns, similarities and differences in data. *Use straightforward scientific evidence to answer questions or to support their findings. *Use secondary sources to support their ideas. *Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. *Identify new questions arising from data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.	*Begin to use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. *Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. *Identify patterns arising in results.	*Identify scientific evidence that has been used to support or refute ideas or arguments. *Use relevant scientific language and illustrations to discuss, communicate and justify scientific ideas and talk about how scientific ideas have developed over time. *Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.