

Science Overview - Reception - linked to skills progression document			
National Curriculum topic	Skills	Ideas	Rationale
Understanding the world, People and communities	Children talk about past and present events in their own lives and in the lives of family members. They know that other children do not always enjoy the same things and are sensitive to this. They know about similarities and differences between themselves and others, and among families, communities and Traditions.	All about me books Family trees Link to stories e.g. three bears Make a timeline Link to seasons	Children begin to look at the world and their surroundings, not just their immediate environment. They begin to look at their bodies and spot similarities and differences between themselves and others, which will later be built upon in year 1. Investigative skills will begin to be practised through a range of activities.
The world	Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.	Outside play Growing plants Having live animals Look at the seasons Experiment with different materials, liquids and unusual ones e.g. cornflour or bubbles Visit a farm Use sand, water and soil to play with Recycle	This topic provides the foundation blocks to lots of scientific topics that will be revisited in the later school years. E.g. materials, states of matter, plants, animals inc humans. The children will have interactive opportunities to explore these different resources and make first-hand scientific hypotheses of the world and begin to explain why they think things happen the way they do.
Technology	Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.	Play with cameras Use IWB Pretend shopping Pretend cooking Use keyboard and mouse Have access to computer	Children to begin linking technology with scientific experimentation and observation skills. The children can use technological tools to record their discoveries and write with it. This will help to build scientific enquiry skills.
Science Overview - Year 1 - linked to skills progression document			

National Curriculum topic	Skills	Ideas	Rationale
Working Scientifically Questioning	Ask questions about what they immediately observe in their environment. Watch something happen and question how or why it happened.	Ask questions such as: Why are flowers different colours? Why do some animals eat meat and others do not?	Simple questions built on general questioning done by teacher from Reception. Linking to observational skills from EYFS.
Working Scientifically Observing and using equipment	Observe something that changes over time e.g. a plant. Use magnifying glasses or hand-lenses to look at objects closely.	Measures to help find out more about the investigation undertaken.	Using tools to measure and help observations, built on from EYFS experiments with containers, magnifying glasses, rulers and other tools.
Working Scientifically Performing simple tests	Performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket?...for curtains? ...for a bookshelf?' Manipulating materials and recording what they notice. Observing a plant over a period and recording results.	Set up a test to see which materials keep things warmest, know that if the test has been successful and can say what has been learned.	Links back to EYFS experimentation of different resources and works to link questioning with testing. Children will already have experience of thinking a question and then trying out a test to see what happens. Children will now have a better understanding of how a test can answer/prove a question's answer.
Working Scientifically Identifying and Classifying	Using simple observations to classify and compare objects e.g. different materials into smooth or hard. Grouping items with one or two simple categories e.g. animals by what they eat.	Notice similarities and differences between materials, plants and animals.	Links back to work from EYFS topics 'Ourselves' and 'The World' by spotting similarities and differences. Children will have already had experience of noticing sensory differences e.g. tactile differences (e.g. hard and soft), visual differences (e.g. shiny and dull), sound differences (high pitch and low pitch) etc. Use this to begin to classify and justify choices.
Working Scientifically Suggesting answers to questions using observations	Begin to make simple connections from data to scientific questions e.g. What has happened to the leaves on the tree? They have turned brown and died because it is Autumn.	Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked.	Children will have experience of explaining their thinking to peers and their EYFS teacher. Year 1 will build on this and children will gain confidence explaining their thinking and using their observations to justify their thinking.

<p>Working Scientifically Gathering and Recording Data</p>	<p>Draw and label simple diagrams e.g. parts of a plant. Keep a record of something that changes over time e.g. as a flower bud opens. Complete simple tables or charts e.g. about the weather.</p>	<p>Use simple tables, photos, drawings, post-it notes and scribes to record ideas.</p>	<p>Children will build on their previous technology skills from EYFS and their drawing and writing skills to record what they see happen.</p>
<p>Seasonal Changes - Autumn 1 <i>Observe changes across the four seasons.</i> <i>Observe and describe weather associated with the seasons and how day length varies.</i></p>	<p>Name the seasons and know about the types of weather in each season.</p>	<p>Dramatise the season weathers. Get out clothing for each season and match to the correct one. Observe a tree over the year and record the leaf changes. Take photos outside of seasonal and weather changes.</p>	<p>Children will build on the knowledge from the EYFS topic of 'Understanding the World' to understand the seasons better. Using observational skills and technology to capture evidence of seasonal (and progression) change over time. Scientific vocabulary for the seasons will be learnt and utilised to describe what they can observe is happening. Seasonal changes are not taught again in KS1 or KS2 but does feed into 'Plants' topic understanding and geography topics.</p>
<p>Plants - Spring 2 <i>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</i> <i>Identify and describe the basic structure of a variety of common flowering plants, including trees.</i></p>	<p>Know and name a variety of wild and garden plants. Know and name the petal, stem, leaves and roots of a plant. Know and name the roots, trunk, branches and leaves of a tree.</p>	<p>Grow a plant in the classroom from seed. Label a diagram or a dried plant in book. Take photos of trees and then label them. Take bark rubbings and leaf rubbings. Learn 'In an English country garden' song.</p>	<p>To build on the knowledge gained from EYFS of outside play, seasonal changes and exposure to plants of different kinds, children can now go to observe and record images/drawings of a richer variety of plants including trees. Children will learn basic structure of a flowering plant which is then used in Year 2 and 3 when Plants will be taught again.</p>
<p>Animals Inc. humans - Spring 1 <i>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</i></p>	<p>Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds. Know and classify animals by what they eat (carnivore, herbivore and omnivore).</p>	<p>Sort pictures of animals by properties. Have live animals come into school.</p>	<p>Children have an opportunity to learn about animals including humans all the way through key stage one and key stage 2. In year one, the children will mostly focus on classifying animals by simple types; sorting living and non-living things and aiming parts of the human body.</p>

<p><i>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</i></p> <p><i>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</i></p> <p><i>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</i></p>	<p>Know how to sort by living and non-living things.</p> <p>Know the name of parts of the human body that can be seen.</p>	<p>Watch parts of nature or David Attenborough programmes.</p> <p>Have an 'Is it alive?' checklist and test against living and non-living items.</p> <p>Label a body, could draw round a child on paper!</p> <p>Play 'head, shoulders, knees and toes!'</p> <p>Read 'funny bones' books.</p>	<p>During reception, the children did some basic understanding of the human body in the topic 'All about ourselves' and looking at similarities and differences between different things in the topic 'The world'.</p> <p>This is the beginning of the children refining their classifying skills and using keen observations to justify their reasons for classifying. This base knowledge will be built upon throughout key stage one and two. They will also have basic vocabulary that is important to understand say that the children can use more complicated terms in later years.</p>
<p>Everyday materials - Autumn 2</p> <p><i>Distinguish between an object and the material from which it is made.</i></p> <p><i>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</i></p> <p><i>Describe the simple physical properties of a variety of everyday materials.</i></p> <p><i>Compare and group together a variety of everyday materials based on their simple physical properties.</i></p>	<p>Know the name of the material an object is made from.</p> <p>Know about the properties of everyday materials.</p>	<p>Scratch, wet, weigh, float different materials and observe results.</p> <p>Group and classify objects based on properties and materials.</p> <p>Go for a 'materials' walk around the school, e.g. how many things made of metal can we find?</p> <p>Look at recycling in the classroom and school.</p>	<p>In this topic, the year one children will investigate what different objects are made of and some of the simple properties of everyday materials. The children have a base knowledge from the reception topic 'The world', in which they were able to play and observe such investigations like pouring, weighing, floating, and grouping simple objects by material and sight.</p> <p>The year one children will work with vocabulary such as rough, soft, elastic, stretchy, etc. this will be helpful because the children will revisit materials in year two and Year 5. Different investigations, the children should be able to justify their classification and grouping of everyday materials based on their findings in these tests. These investigations will help develop the scientific inquiry skills related to gathering and recording ideas and drawing conclusions.</p>
<p>Science Overview - Year 2 - linked to skills progression document</p>			
<p>National Curriculum topic</p>	<p>Skills</p>	<p>Ideas</p>	<p>Rationale</p>

<p>Working Scientifically Questioning</p>	<p>Begin to ask questions about the wider world and not just, what they can immediately see. Begin to develop their own questions on a topic and consider ways they could find out how to answer it.</p>	<p>Ask questions such as: Why do some trees lose their leaves in Autumn and others do not? How long are roots of tall trees? Why do some animals have underground habitats?</p>	<p>Children will build upon their questioning skills that they learned in Year One by beginning to develop their own questions on a topic and think of ways they could find out how to answer it. This is great practice for Year 3, in which they will have to create their own questions and the accompanying test to help answer the question.</p>
<p>Working Scientifically Observing and using equipment</p>	<p>Use hand-lenses, magnifying glasses, thermometers and egg timers in simple practical sessions. Notice changes in temperature, shape, colour, consistency and when there is no change at all.</p>	<p>Use equipment such as thermometers and rain gauges to help observe changes to local environment as the year progresses. Use microscopes to find out more about small creatures and plants.</p>	<p>Children will use more complicated pieces of equipment in Year 2 such as thermometers and egg timers. They will also notice changes in temperature, colour, shape and, most importantly, if there has been no change at all. These are important observation skills that will enhance the children's practical enquiries when they go into Year 3.</p>
<p>Working Scientifically Performing simple tests</p>	<p>Begin to understand what a fair test is and how to do one correctly. Begin to do more than one test to compare results e.g. plant in the dark and plant in the light to compare requirements for a plant. Begin to conduct tests that show properties of objects e.g. materials, and consider how they affect the purpose of the object - e.g. metal is firm, does not bend and is waterproof that is why it is used on cars and buildings.</p>	<p>Know how to set up a fair test and do so when finding out about how seeds grow best</p>	<p>In Year 2, the children will have the opportunity to do a series of tests to investigate a single question and compare results. Also, the children will begin to understand what a fair test is and why it is important when conducting a practical enquiry. These testing skills are necessary for Key Stage 2 as they build up the process of testing, concluding and evaluating.</p>
<p>Working Scientifically Identifying and Classifying</p>	<p>Begin to compare and classify objects that are not commonly known to them e.g. animals from a</p>	<p>Classify or group things according to a given criteria,</p>	<p>Children will use their classifying and grouping skills from the previous year and expand these by classifying and grouping using several categories instead of only</p>

	farm with animals from the beach. Grouping and classifying with several categories and be able to explain choices.	e.g. deciduous and coniferous trees	two. This will make the children explain their choices more carefully and will feed into this scientific inquiry skill which is helpful for Key Stage 2.
Working Scientifically Suggesting answers to questions using observations	Notice patterns and relationships from more complex data. E.g., The material could be squashed but cannot return to the shape it was before. However, another material can be squashed, and it bounces back into its original shape that material is more flexible or less firm than the other is.	Draw conclusions from fair tests and explain what has been found out	The children will practice using their fair testing skills that they learned in year one and develop them further during Year 2. This should hopefully ensure that the children understand what a fair test is, how to draw conclusions from a fair test and finally explain clearly what has been discovered from the test. The next stage of this will be using these observations to link back to their original scientific question but this is matured in Year 3.
Working Scientifically Gathering and Recording Data	Record information using tables, explanation sentences, food chains, charts, simple graphs and labelled diagrams. They should (with help) be able to explain what they have found out and use simple scientific language when explaining their recorded data.	Use measures (within Year 2 mathematical limits) to help find out more about the investigations they are engaged with	In this year, the children will move on from using simple diagrams and sentences to explain their data and instead begin to use simple graphs, charts and labelled diagrams. the children will also be using measurement skills within their year group with more complicated equipment compared to the previous year. The scientific vocabulary used during Year 2 should help them to be able to explain their recorded data as well.
Plants - Spring 1 <i>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.</i>	Know and explain how seeds and bulbs grow into plants. Know what plants need in order to grow and stay healthy (water, light & suitable temperature).	Grow a bulb in classroom. Find acorns or other seeds that have begun to sprout, take them apart and look inside. Test what a plant needs by removing certain elements e.g. soil, water, light.	In Year One, the children learned the basic features of a flowering plant and in this year the children will use this knowledge as well as discovering how seeds and bulbs grow into plants. They will also further their understanding of how to keep a plant healthy and what it needs to grow. Understanding what a plant needs to grow links to the Year 3 topic of plants where they learn about water transportation and other elements linked to healthy plant growth.

<p>Animals Inc. humans - Spring 2 <i>Notice that animals, including humans, have offspring, which grow into adults.</i> <i>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</i> <i>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</i></p>	<p>Know the basic stages in a life cycle for animals, (including humans). Know why exercise, a balanced diet and good hygiene are important for humans.</p>	<p>Look at life cycle of chicks and tadpoles. Have caterpillars and butterflies in classroom and link to Very Hungry Caterpillar. Create a healthy plate. Practice exercising and measuring heart rate or measure steps with a pedometer. Watch nature documentaries on animal survival. Do a 'desert island' activity - what do I need to survive?</p>	<p>Links to the PSHE sex and relationships education. The children will know some of the basic ways in which to keep a healthy diet and why exercise is important for humans; this is later revisited in years four and five where they focus on the digestive system and healthy eating. This unit also includes what animals need to survive which links to the year 6 topic of adaptation and evolution. The children will have had first-hand experience of chicks or ducklings from reception and looked at the life cycle of a caterpillar or tadpole by this point. This is a good unit that helps the children reflect on their own lifestyles and become more aware of what they eat and how they exercise to remain healthy.</p>
<p>Everyday materials - Autumn 1 <i>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for uses.</i> <i>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</i></p>	<p>Know how materials can be changed by squashing, bending, twisting and stretching. Know why a material might or might not be used for a specific job.</p>	<p>Test materials by squashing, twisting etc. Use scientific vocabulary to describe what is happening. Group and classify materials with their properties. Create and consider 'what if?' questions based on properties e.g., What if teapots were made of chocolate? What if umbrellas were made of paper? What if elastic bands were made of glass?</p>	<p>This topic gives children the opportunity to conduct many different enquiries to investigate and compare different materials. This unit builds on nicely from the unit in year one so it can both enable the teacher to revisit any areas the class didn't fully understand, go over scientific vocabulary to describe materials and their properties, and allow the children to have fun coming up with their own investigations and questions. When the children are in Year 5, they will look at more complicated properties of materials such as transparency, versatility and functions related to their properties. Therefore, it is important to cement the scientific vocabulary and give multiple opportunities to test these materials during this unit.</p>
<p>Living things and their habitats - Summer 1</p>	<p>Classify things by living, dead or never lived.</p>	<p>Go bug hunting. Have a wormery or ant container.</p>	<p>This is the first unit of 'living things and their habitats' during primary school however it is revisited in Years 4, 5 and 6. This unit also links to Geography topics and</p>

<p><i>Explore and compare the differences between things that are living, dead, and things that have never been alive</i></p> <p><i>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.</i></p> <p><i>Identify and name a variety of plants and animals in their habitats, including microhabitats.</i></p> <p><i>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.</i></p>	<p>Know how a specific habitat provides for the basic needs of things living there (plants and animals).</p> <p>Match living things to their habitat</p> <p>Name some different sources of food for animals.</p> <p>Know about and explain a simple food chain.</p>	<p>Classify items by dead, living and never alive - how do we know?</p> <p>Watch nature series e.g. In the undergrowth, to see how microhabitats work.</p> <p>Create simple food chains.</p> <p>Study different extreme habitats with a plant, animal and insect that lives in each one and how it is adapted e.g. Desert - desert fox, burrowing spider, and cactus.</p>	<p>Environmental Science. It will build on the children's understanding of the differences between living and non-living things. This unit should begin to expand children's understanding of different types of animals and their habitats. They should also be able to explain a simple food chain and know the differences between predator, prey and food source.</p>
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Science Overview - Year 3 - linked to skills progression document

National Curriculum topic	Skills	Ideas	Rationale
<p>Working Scientifically</p> <p>Questioning</p>	<p>Begin to ask own relevant questions that can be answered with a simple scientific enquiry.</p>	<p>Ask questions such as:</p> <p>Why does the moon appear as different shapes in the night sky?</p> <p>Why do shadows change during the day?</p> <p>Where does a fossil come from?</p> <p>Use research to find out what the main differences are</p>	<p>In year 3, this questioning skill is being refined by encouraging the children to seek out relevant questions for each unit that can be tested using a scientific inquiry. This is to encourage independent thought and to encourage children to think scientifically about how to answer a question.</p>

		<p>between sedimentary and igneous rocks.</p> <p>Use research to find out how reflection can help us see things that are around the corner.</p>	
<p>Working Scientifically Observing and using equipment</p>	<p>Begin to make systematic and careful observations. Taking accurate measurements using standard units using thermometers, data loggers, cylinders, timers and magnifying glasses.</p>	<p>Observe at what time of day a shadow is likely to be at its longest and shortest.</p> <p>Observe which type of plants grow in different places e.g. bluebells in woodland, roses in domestic gardens, etc.</p> <p>Use a thermometer to measure temperature and know there are two main scales used to measure temperature.</p>	<p>In year three, the children will build on their observation skills from the previous year and can use more complicated equipment. The biggest difference is that they will be using equipment that takes data overtime for example data loggers, which require a greater level of concentration and accurate measuring during a practical enquiry.</p>
<p>Working Scientifically Performing simple tests</p>	<p>Begin to independently set up practical enquiries, comparative and fair tests.</p>	<p>Explain to a partner why a test is a fair one e.g. lifting weights with right and left hand, etc.</p> <p>Set up a fair test with different variables e.g. the best conditions for a plant to grow. Peach preservation, choosing correct liquid to preserve peach. Variables include size of peach, types of liquid and storage.</p> <p>Test to see if their right hand is as efficient as their left hand.</p>	<p>During this year, the children should have the opportunity to begin to independently set up practical enquiries, comparative tests and fair tests. This couples with the questioning skill because the children should be able to design their own practical inquiry to match their independently chosen question. This is also the beginning for the children to understand how different variables can affect a fair test.</p>

		Test to see which type of soil is most suitable when growing two similar plants.	
Working Scientifically Identifying and Classifying	Compare and group items from a variety of categories. Begin to explain choices using scientific vocabulary to justify choices.	Group information according to common factors e.g. plants that grow in woodlands or plants that grow in gardens.	The children should now be able to compare and group items or data into a variety of different categories. This is different from the year 2 skill because they must justify their choices of classifying by using discreet scientific vocabulary.
Working Scientifically Suggesting answers to questions using observations	Begin to use scientific vocabulary more confidently when explaining results and drawing conclusions.	Be confident to stand in front of others and explain what has been found out, for example about how the moon changes shape. Be prepared to change ideas as a result of what has been found out during a scientific enquiry. Amend predictions according to findings. Make sense of findings and draw conclusions, which help them to understand more about scientific information. Present findings using written explanations and include diagrams when needed.	In year 3, the children should begin to use scientific vocabulary more confidently when explaining their results and drawing conclusions from their independent practical inquiries. They should also be prepared to change ideas, as a result of what has been found out and use this to help their evaluations of their own practical enquiry. This is again to further their own independence when doing practical enquiries.
Working Scientifically Gathering and Recording Data	Collect data from their own observations and measurements, using notes, simple tables and standard units and help to make decisions about how to record and analyse this data.	Measure carefully (taking account of mathematical knowledge up to Year 3) and add to scientific learning. Gather and record information using a chart, matrix or tally	The children will collect data from their own observations and measurements using a variety of simple tables, units and display information using charts or graphs. They should also begin to decide how to record and analyse this data independently.

		<p>chart, depending on what is most sensible.</p> <p>Use bar charts and other statistical tables (in line with Year 3 mathematics statistics) to record findings.</p> <p>Know how to use a key to help understand information presented on a chart.</p>	
<p>Animals Inc. humans - Spring 1</p> <p><i>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.</i></p>	<p>Know about the importance of a nutritious, balanced diet.</p> <p>Know how nutrients, water and oxygen are transported within animals and humans.</p> <p>Know about the skeletal and muscular system of a human.</p>	<p>Keep a food diary.</p> <p>Create a healthy plate.</p> <p>Record number of breaths, heart rate or steps over a period of exercise.</p> <p>Look at actual skeletons.</p> <p>Create and label skeletons using card and drawing pins.</p> <p>Investigate lungs, kidneys, bladder and blood to a degree to see how things are transported round the body - could dramatize it. Life bus.</p>	<p>This unit links back to the previous one from year 2, however it expands the children's understanding of the importance of a healthy balanced diet. Further to this, the children will learn how nutrients, water and oxygen are transported within animals and the human body. Also, to look at the skeletal and muscular systems of a human. The children should have the opportunity to practice practical enquiries that measure their heart rate and number of breaths.</p>
<p>Light - Summer 2</p> <p><i>Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed</i></p>	<p>Know that dark is the absence of light.</p> <p>Know that light is needed in order to see and is reflected from a surface.</p> <p>Know and demonstrate how a shadow is formed and explain how a shadow changes shape.</p> <p>Know about the danger of direct sunlight and describe how to keep</p>	<p>Try to create complete darkness.</p> <p>Investigate reflecting light off different surfaces, could look at matte and gloss paint.</p> <p>Record shadows on playground over time, draw on ground with chalk.</p> <p>Create own sundials.</p>	<p>In this unit the children learn the basic properties of light including: understanding that darkness is the absence of light; that light is needed in order to see and is reflected ; how shadows are formed; how shadows change shape and finally how to protect yourself from sunlight.</p> <p>When the children are in year 6, they review these properties of light but also investigate spectrum of light, reflections and refraction of light, plus other more complicated properties of light. Light is only</p>

<p><i>when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change.</i></p>	<p>protected.</p>	<p>Create sun safety posters for the school.</p>	<p>taught in these two year groups so it is imperative that the children grasp a good understanding of light.</p>
<p>Plants - Summer 1 <i>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</i></p>	<p>Know the function of different parts of flowing plants and trees. Know how water is transported within plants. Know the plant life cycle, especially the importance of flowers.</p>	<p>Cut open roots and stems to see transportation paths for water. Water transportation diagram colour the water flow. Look at leaves and veins in them, link to animals Inc. humans work. Create plant cycles, act them out, and create a piece of artwork about it. Grow a plant in the classroom and observe such as cress. Go out and observe insects visiting flowering plants, particularly ones such as lavender. Watch documentaries on plants with alternative diets, e.g. Venus flytrap!</p>	<p>This is the final unit of plants taught before key stage 3. The children should have a good grounding of knowledge of plants from year two and year one. In this topic in year three the children look at the requirements of plants for life and growth, identify and describe the functions of different flowering plants, explore how water is transported within plants and finally look at the life cycle of a flowering plant. The main new knowledge gained from this unit is to do with pollination and water transportation. It gives good opportunities for children to dissect, interpret and investigate plants on a much more established level through independent investigations.</p>
<p>Forces and magnets - Autumn 2 <i>Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some</i></p>	<p>Know about and describe how objects move on different surfaces. Know how a simple pulley works and use to on to lift an object. Know how some forces require contact and some do not, giving examples. Know about and explain how</p>	<p>Explore magnets on different surfaces. Investigate strength of magnetic force, e.g. how many sheets of paper between magnet and item before it is no longer attracted? How many paperclips can 'stick'</p>	<p>This is the only unit on magnets during key stage one and two; however forces are revisited in Year 5. The children will learn about how different objects can move on different surfaces, how simple police can work, different uses of forces, understanding magnets attraction and repulsion comma and finally using this knowledge to predict if a magnet will attract or repel a material or another magnet. There is a lot of scientific vocabulary that accompanies this unit and it is</p>

<p>materials and not others. Compare and group together a variety of everyday materials based on 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.</p>	<p>magnets attract and repel. Predict whether magnets will attract or repel and give a reason.</p>	<p>together through magnetic force alone? Observe and record push and pull forces. Label diagrams with words such as up-thrust, air resistance etc. Create parachutes to test forces. Use cars on ramps that have different surfaces.</p>	<p>imperative that the children use this instead of words like stick and glued together for instance. The unit also gives a great opportunity for lots of independent investigations using magnets and a great opportunity to explore magnets and materials in a similar way to the freedom they had when they were in reception.</p>
<p>Rocks and soils - Autumn 1 Compare and group together different kinds of rocks because 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.</p>	<p>Compare and group rocks based on their appearance and physical properties, giving reasons. Know how soil is made and how fossils are formed. Know about and explain the difference between sedimentary, metamorphic and igneous rock.</p>	<p>Scratch, wet and draw rocks of different types. Learn the 'three types of rock' song! Look at fossils or pieces of amber. Sift soil. Do the 'messy bucket' challenge, can you filter, sieve and pick out rocks and soil until clean water is left? Could link to Water Aid.</p>	<p>In this unit the Year 3 will spend a lot of time grouping and classifying rocks and soils based on their properties. The skills needed for this link back to their previous units on properties of materials because many of the descriptive vocabulary of materials can be used in this classifying unit. When the children are in year 6, they will revisit fossils in the 'evolution and adaptation' unit. This unit is also helpful to link to key stage three geography by understanding different types of rocks, soil and how rocks are formed.</p>
<p>Science Overview - Year 4 - linked to skills progression document</p>			
<p>National Curriculum topic</p>	<p>Skills</p>	<p>Ideas</p>	<p>Rationale</p>
<p>Working Scientifically Questioning</p>	<p>Ask own questions relevant to the topic that can be answered with a range of scientific enquiries.</p>	<p>Ask questions such as: Why are steam and ice the same thing?</p>	<p>In year 4 the next stage for the questioning skill is for the children to be able to ask questions that enable a range of scientific inquiries. They also have more confidence, compared to year 3, to suggest their own</p>

	Suggest own enquiries to answer the questions.	<p>Why is the liver important in the digestive systems? What do we mean by 'pitch' when it comes to sound? Use research to find out how much time it takes to digest most of our food. Use research to find out which materials make effective conductors and insulators of electricity.</p>	enquiries to answer questions raised either by themselves or by the teacher.
Working Scientifically Observing and using equipment	Make systematic and careful observations. Taking accurate measurements using standard units using thermometers, data loggers, cylinders, timers and magnifying glasses. Deciding when a fair test is necessary and help decide how to set it up. Begin to recognise when secondary sources are needed to answer questions.	<p>Use a thermometer to measure temperature and know there are two main scales used to measure temperature. Use a data logger to check on the time it takes ice to melt to water in different temperatures.</p>	In the scientific inquiry skill, the children will build on their previous observation skills and measurement skills. They will use lots of different equipment including thermometers, dataloggers, timers and microscopes. When they were in year 3, they were beginning to recognise when to do a fair test accurately and now they will decide when a fair test is necessary and how best to set it up. In addition to this, they will begin to recognise when secondary sources are needed to answer questions for example research, a second practical inquiry or evaluation of results.
Working Scientifically Performing simple tests	Independently set up and complete practical enquiries, comparative and fair tests. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions and recognise when a simple fair test is necessary and help to decide how to set it up.	<p>Carry out tests to see, for example, which of two instruments make the highest or lowest sounds and to see if a glass of ice weighs the same as a glass of water. Set up a fair test with more than one variable e.g. using different materials to cut out sound.</p>	The children will continue to independently set up and complete practical tests, as they did in year 3. However, the focus is more on whether a fair test is required and how to set it up.

		Explain to others why a test that has been set up is a fair one e.g. discovers how fast ice melts in different temperatures.	
Working Scientifically Identifying and Classifying	Compare and group items form a variety of categories. To explain choices using scientific vocabulary to justify choices. Talk about criteria for grouping, sorting and classifying; and use simple keys.	Group information according to common factors e.g. materials that make good conductors or insulators.	The skill is enhanced in year 4 using talk and justifying choices when identifying and classifying data.
Working Scientifically Suggesting answers to questions using observations	To use scientific vocabulary more confidently when explaining results and drawing conclusions. To relate findings back to the original question and consider what to do as a next step.	Present findings using written explanations and include diagrams, when needed. Write up findings using a planning, doing and evaluating process. Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned. When making predictions there are plausible reasons as to why they have done so. Able to amend predictions according to findings. Prepared to change ideas as a result of what has been found out during a scientific enquiry.	In this concluding and evaluating skill, the children will begin to use scientific vocabulary more confidently when explaining their results and relate their findings back to the original scientific question, and how they can further the investigation independently.

<p>Working Scientifically Gathering and Recording Data</p>	<p>Collect data from their own observations and measurements, using notes, simple tables and standard units and help to make decisions about how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.</p>	<p>Measure carefully (taking account of mathematical knowledge up to Year 4) and add to scientific learning. Gather and record information using a chart, matrix or tally chart, depending on what is most sensible. Use bar charts and other statistical tables (in line with Year 4 mathematics statistics) to record findings.</p>	<p>The difference in this skill, compared to previous year groups, is that the children should begin to look for changes and patterns in their data to help them when creating their conclusions. It is the beginning of more sophisticated analysis skills which will then be worked upon in the later key stage two years.</p>
<p>Animals Inc. humans - Spring 1 <i>Describe the simple functions of the basic parts of the digestive system in humans</i> <i>Identify the different types of teeth in humans and their simple functions.</i> <i>Construct and interpret a variety of food chains, identifying producers, predators and prey.</i></p>	<p>Identify and name the parts of the human digestive system. Know the functions of the organs in the human digestive system. Identify and know the different types of human teeth. Know the functions of different human teeth. Use and construct food chains to identify producers, predators and prey.</p>	<p>Act out being food in the digestive system. Create a comic strip of food going through the digestive system. Use mirrors to look at teeth. Have a dentist come to visit and speak about the children's teeth. Create food chains.</p>	<p>The children will learn the simple functions of the digestive system in humans and different types of teeth of both animals and humans. The children should have had other opportunities to discuss teeth in PSHE lessons as well. This unit also builds upon the simple food chains that the children were creating in year 2 but with more complex chains and webs being used.</p>
<p>Electricity - Autumn 1 <i>Identify common appliances that run on electricity.</i> <i>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</i> <i>Identify whether a lamp will light in a simple series circuit, based on</i></p>	<p>Identify and name appliances that require electricity to function. Construct a series circuit. Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers). Predict and test whether a lamp will light within a circuit.</p>	<p>Go for an electricity walk round the school. Create simple series circuits. Put a series circuit into a project e.g. make a lighthouse. Test different materials for conductivity. Create switches of different types and test them.</p>	<p>This is the first of two electricity units in key stage 2; the second unit is in year 6. In year 4, the children are exposed to different components of a series circuit, understanding the functions of switches, knowing the difference between conductors and insulators, and recognising different appliances that need electricity. Whereas in year 6, the focus is more on the current and how it is affected using a different component in the circuit. Electrical safety is also an important theme</p>

<p><i>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 a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.</i></p>	<p>Know the function of a switch. Know the difference between a conductor and an insulator; giving examples of each.</p>		<p>within this scientific unit and links to geography and PSHE. children should be given the opportunity to do lots of practical enquiries to answer set questions and questions of their own thinking.</p>
<p>Living things and their habitats - Spring 2 <i>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.</i></p>	<p>Use classification keys to group, identify and name living things. Know how changes to an environment could endanger living things.</p>	<p>Visit the WWF. Look into endangered species, create a project on one of them. Link to climate change. Use the Woodland trust website and look at local environment and animals. Use keys to group and classify species and types of animals.</p>	<p>The children lasted this type of unit when they were in year 2, focusing on the differences between living and non-living things plus how to classify them simply. This unit will also be revisited in year five and year 6. In year 4, the children will begin to explore and use classification keys to help Group A variety of different living things from the environment and also began to understand how changes to environment (e.g. climate change) can impact the things that live there. Again, it links to environmental science opportunities as well as working outside the classroom.</p>
<p>Sound - Autumn 2 <i>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</i></p>	<p>Know how sound is made, associating some of them with vibrating. Know how sound travels from a source to our ears. Know the correlation between pitch and the object producing a sound. Know the correlation between the volume of a sound and the strength of the vibrations that produced it. Know what happens to a sound as it travels away from its source.</p>	<p>Create string telephones. Use speakers and microphones. Put rice on a drum and watch vibrations when hit. Try passing sound through different materials. Try to create different pitches of sound using instruments and other materials.</p>	<p>This is the only unit of sound in the entire primary curriculum; however, sound is revisited in key stage 3. The children learn how sounds are made; recognise how vibrations travel through the air and begin to find relationships between pitch and sound. It is important that the children are confident with the scientific vocabulary of this unit as they will not be revisiting it until secondary school. It does link to some of the forces units, however it is best to focus mostly on how the sound travels through the air in waves.</p>

<p>vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.</p>			
<p>States of matter - Summer 1 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.</p>	<p>Group materials based on their state of matter (solid, liquid, gas). Know the temperature at which materials change state. Know about and explore how some materials can change state. Know the part played by evaporation and condensation in the water cycle.</p>	<p>Measure temperature of solids as they melt to become liquids e.g. chocolate. Pretend to be particles when activated by heat or cold. Use kettles, salt and ice to show boiling, melting and evaporating.</p>	<p>In this unit children understand the differences between solids, liquids and gases. The children will have come across the words liquid and solid and gas previously through exploration of materials, however in this unit they can understand their properties in terms of molecules. Children will also look at melting, boiling and evaporation which is later reinforced in Year 5 as part of the 'changing materials' unit. The children also learn about the water cycle which links to geography and environmental science.</p>

Science Overview - Year 5 - linked to skills progression document

National Curriculum topic	Skills	Ideas	Rationale
<p>Working Scientifically Questioning</p>	<p>Questions develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.</p>	<p>Able to give an example of something focused on when supporting a scientific theory e.g. how much easier it is to lift a heavy object using pulleys. Make predictions based on information gleaned from investigations. Frequently carry out research when investigating a scientific principle or theory.</p>	<p>The children are now developing questioning skills of a more mature level, taking into account practical enquiries and knowledge that they've gained from other years and reflecting on this to help them to predict outcomes in practical enquiries and also understanding how different scientific concepts work. They should be confident in exploring and talking about their own ideas and creating their own questions by this stage, Furthermore the teacher should be encouraging more abstract ideas to stretch their thinking.</p>

<p>Working Scientifically Observing and using equipment</p>	<p>To grow more confident at taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. Taking accurate measurements using standard units using thermometers, data loggers, cylinders, timers and magnifying glasses</p>	<p>Use other scientific instruments as needed e.g. thermometer, rain gauge, spring scales (for measuring Newtons).</p>	<p>By Year 5, the children should have a good level of confidence at taking measurements using lots of different scientific equipment with accuracy and precision. This includes recognising when to take repeat readings and making their own decisions about what observations to make and how to make them. The children should begin to choose their own equipment and be able to justify their choices.</p>
<p>Working Scientifically Performing simple tests</p>	<p>Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They need to be able to justify their choice of experiment.</p>	<p>Set up an investigation when it is appropriate e.g. finding out which materials dissolve or not. Set up a fair test when needed e.g. which surfaces create most friction? Set up an enquiry-based investigation e.g. find out what adults / children can do now that they could not when a baby. Know what the variables are in each enquiry and can isolate</p>	<p>Children should now be able to select, plan and execute the best scientific inquiry to answer the question. They should be comfortable with how and when to use for testing and be aware of which variables must be measured or controlled. They should be able to justify their choice of experiment to peers and their teacher. These are skills that are needed in year 6 and key stage 3.</p>

		<p>each one when investigating e.g. finding out how effective parachutes are when made with different materials.</p> <p>Create new investigations which take account of what has been learned previously</p>	
<p>Working Scientifically Identifying and Classifying</p>	<p>Suggest categories from grouping and classifying. Noticing patterns, grouping and classifying things. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.</p>	<p>Keep an on-going record of new scientific words that they have come across for the first time.</p> <p>Able to relate causal relationships when, for example, studying life cycles.</p>	<p>Compared to previous years, the children should now have a better awareness of scientific vocabulary that is related to identifying and classifying and be noting it to use when justifying the grouping and categories. They should be able to use keys and other information records to describe data and identify patterns. This also links with later key stage two geography skills.</p>
<p>Working Scientifically Suggesting answers to questions using observations</p>	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. They should be able to evaluate the effectiveness of the test done and consider next steps in the investigation.</p>	<p>Able to present information related to scientific enquiries in a range of ways including using IT such as power-point and iMovie.</p> <p>Is evaluative when explaining findings from scientific enquiry.</p> <p>Clear about what has been found out from recent enquiry and can relate this to other enquiries, where appropriate.</p> <p>Their explanations set out clearly why something has happened and its possible impact on other things.</p>	<p>The difference in Year 5 is that the children should now be able to have logical debates with each other about whether their scientific evidence supports or disagrees with their conclusions. They should use scientific vocabulary and illustrations to communicate and justify their ideas and possibly linked to how science has changed overtime. They should be able to evaluate how effective the test was and, similarly in year 4, be thinking about what the possible next steps in the investigation could be.</p>

<p>Working Scientifically Gathering and Recording Data</p>	<p>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.</p>	<p>Use all measurements as set out in Year 5 mathematics (measurement), including capacity and mass. Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs. Use diagrams, as and when necessary, to support writing.</p>	<p>In year five the children should be able to present their data in a variety of different ways including scatter graphs, classification keys and diagrams with labels. The children should be able to present their findings in presentations and well-written explanations. These are the building blocks towards gathering and recording data skills needed in year six and key stage 3.</p>
<p>Changing materials - Autumn 1 <i>Compare and group together everyday materials based on 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</i></p>	<p>Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets. Know and explain how a material dissolves to form a solution. Know and show how to recover a substance from a solution. Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating). Know and demonstrate that some changes are reversible, and some are not.</p>	<p>Dissolve salt or sugar and evaporate them. How to get the cleanest water? Link to Oxfam or another charity - use filtration, sieving, evaporation and distillation. Investigate which chocolate melts the quickest. Use cooking to show irreversible reactions. Use yeast to show it creates a product that is irreversible.</p>	<p>This is the final unit in primary school to do with materials and their properties. It Extends their understanding of materials and their properties, states of matter and how materials are affected by forces such as heat, electricity and solutions. By the end of this unit, the children need a confident understanding of processes such as filtration, evaporation, melting, dissolving and conduction; ready for more complicated practical inquiries in key stage 3. They should understand the difference between reversible and irreversible reactions and how to explain these using scientific vocabulary. There are many opportunities for interesting practical inquiries in this unit and for the children to explore more abstract ideas whilst using accurate measurements and presenting their findings in more complex manners.</p>

<p><i>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</i></p> <p><i>Demonstrate that dissolving, mixing and changes of state are reversible changes</i></p> <p><i>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.</i></p>	<p>Know how some changes result in the formation of a new material and that this is usually irreversible.</p>		
<p>Living things and their habitats - Autumn 2</p> <p><i>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</i></p> <p><i>Describe the life process of reproduction in some plants and animals.</i></p>	<p>Know the life cycle of different living things e.g. mammal, amphibian, insect and bird.</p> <p>Know the differences between different life cycles.</p> <p>Know the process of reproduction in plants.</p> <p>Know the process of reproduction in animals.</p>	<p>Create life cycle posters or comic strips.</p> <p>Watch David Attenborough programmes such as Planet Earth or Life in the undergrowth.</p> <p>Dramatize being a bee and pollinating, with the process of what happens to the plant.</p> <p>Create fact files about different animals, their courtships and offspring e.g. peacocks, rainforest frogs, snakes etc.</p> <p>Have frogspawn in the classroom and watch them</p>	<p>This unit expands the year 2 Unit of understanding reproduction in animals and plants and links to the sex and relationships education curriculum. The children will look at different life cycles of animals and plants, compare them and gain scientific vocabulary related to them.</p>

		grow to frogs and release in Wild Garden.	
<p>Earth and Space - Spring 1 <i>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</i> <i>Describe the movement of the Moon relative to the Earth.</i> <i>Describe the Sun, Earth and Moon as approximately spherical bodies.</i> <i>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</i></p>	<p>Know about and explain the movement of the Earth and other planets relative to the Sun. Know about and explain the movement of the Moon relative to the Earth. Know and demonstrate how night and day are created. Describe the Sun, Earth and Moon (using the term spherical).</p>	<p>Watch the stars at night. Look through a telescope. Hire a planetarium. Create a model of the planets. Act out the orbits of the planets outside. Use torches to show patterns of the moon. Keep a moon diary.</p>	<p>This is a stand-alone unit in the science curriculum of Year 5 and focuses on the planets, day and night and the movement of the earth. It does have links to the two light units, as you can go into shadows and the lunar cycle. There are a lot of misconceptions that can occur during this unit so it is imperative that the children have a good understanding of how the earth and other planets move relative to the sun and the teacher demonstrates clearly how night and day are made.</p>
<p>Forces - Spring 2 <i>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</i> <i>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</i> <i>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</i></p>	<p>Know what gravity is and its impact on our lives. Identify and know the effect of air and water resistance. Identify and know the effect of friction. Explain how levers, pulleys and gears allow a smaller force to have a greater effect.</p>	<p>Create something using pulleys and gears – link to DT. Visit an airfield to discuss air resistance. Use a hairdryer and ping pong balls to show air resistance and going against gravity. Experiment with elastic bands.</p>	<p>Forces was briefly looked at in year 4 when linked to magnets, however now the children will look at forces such as gravity, air resistance, friction and water resistance. In addition to this, mechanisms including levers and pulleys that demonstrate force are looked at in this unit and serve as concrete links to the design technology curriculum.</p>
<p>Animals including humans - Summer 1 <i>Describe the changes as humans develop to old age.</i></p>	<p>Create a timeline to indicate stages of growth in humans.</p>	<p>Create a timeline. Interview child, adult and elderly person about diet, exercise, growth and changes.</p>	<p>This is a straightforward module that looks at how humans change and develop from infancy to old age. This can be linked with puberty talks, which often</p>

		Look at skeletons of life stages.	happened in Year 5, and easily links the science with the PSHE curriculum.
Science Overview - Year 6 - linked to skills progression document			
National Curriculum topic	Skills	Ideas	Rationale
Working Scientifically Questioning	Questions develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time.	Know which type of investigation is needed to suit scientific enquiry e.g. looking at the relationship between pulse and exercise. Explanations set out clearly why something has happened and its possible impact on other things. Frequently carry out research when investigating a scientific principle or theory.	By the time the children are in year 6, they should be confident at exploring and talking about their ideas; asking the wrong questions about things they do not understand; explore abstract ideas and link all this to the awareness of the wider world. They should also be exposed to how scientific ideas may have changed overtime for example carrying out a research project on a scientific theory or principle. Questions should be orated or written concisely and clearly with good thinking behind them.
Working Scientifically Observing and using equipment	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. Taking accurate	Know how to set up an enquiry-based investigation e.g. what is the relationship between oxygen and blood? Make accurate predictions based on information gleaned from their investigations and create new investigations as a result.	All measuring skills should be accurate and precise regardless of equipment choices and the children should be able to explain how to take measurements accurately and why it is so important. The children should also be able to make decisions about what they will observe, how they will observe them, for how long and finally whether repetition would be necessary.

	measurements using standard units using thermometers, data loggers, cylinders, timers and magnifying glasses		
Working Scientifically Performing simple tests	Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately.	Set up a fair test when needed e.g. does light travel in straight lines? Know what the variables are in each enquiry and can isolate each one when investigating. Justify which variable has been isolated in scientific investigation.	Over the course of key stage one and key stage 2, the children would have had multiple opportunities for a variety of different scientific enquiries therefore in year 6 they should be able to select and plan the most appropriate type when answering a question . Furthermore, they should be able to independently decide on the variables to be controlled when fair testing, consider measurements and finally selecting the most appropriate equipment to complete the test. These are all necessary for performing tests in key stage 3 when they will be using more complex equipment then readily available for primary school.
Working Scientifically Identifying and Classifying	Suggest categories from grouping and classifying. Noticing patterns, grouping and classifying things. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. Use Venn diagrams with two or more circles to classify information that is more complex. Look for patterns, similarities and	Keep an on-going record of new scientific words that they have come across for the first time and use these regularly in future scientific write ups. Able to give an example of something they have focused on when supporting a scientific theory e.g. classifying vertebrate and invertebrate creatures or why certain creatures choose their unique habitats.	Year six children should be able to notice patterns, trends and other information when grouping classifying different things. They should be able to put data into Venn diagrams with at least 2 circles and look for similarities and differences. They should also be continuing to note down scientific vocabulary and use it consistently in their scientific writing along with examples to justify identification and classification.

	differences between items with interest.		
Working Scientifically Suggesting answers to questions using observations	Identifying scientific evidence that can support or refute ideas or arguments. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. They should be able to evaluate the effectiveness of the test done and consider next steps in the investigation. Draw comparisons with other's results and consider how the variables may have affected results and therefore the answer to their scientific question.	Able to present information related to scientific enquiries in a range of ways including using IT such as power-point, animoto and iMovie. Clear about what has been found out from their enquiry and can relate this to others in class. Aware of the need to support conclusions with evidence.	Like Year 5, the children should now be able to use their data to either support or debate their own and others work. They should be able to use scientific vocabulary and illustrations to explain their thinking including more abstract ideas. They should be able to present information clearly and in a range of ways along with drawing comparisons with other people's results and using all this information to evaluate their scientific enquiries.
Working Scientifically Gathering and Recording Data	They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. Recording data	Use all measurements as set out in Year 6 mathematics (measurement), including capacity, mass, ratio and proportion. Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs. Use a range of written methods to report findings,	In Year 6, the children should be making ultimate decisions on how to record and gather data from their enquiries and decide whether further tests would be needed or secondary sources. They should use a range of written methods to report their findings and record data using a range of ways such as diagrams, classification keys and different graphs confidently. They should also be able to analyse their results to make further predictions for other enquiries.

	<p>and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Using test results to make predictions to set up further comparative and fair tests</p> <p>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.</p>	<p>including focusing on the planning, doing and evaluating phases.</p> <p>Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class.</p>	
<p>Light - Autumn 1</p> <p><i>Recognise that light appears to travel in straight lines</i></p> <p><i>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</i></p> <p><i>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</i></p> <p><i>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</i></p>	<p>Know how light travels.</p> <p>Know and demonstrate how we see objects.</p> <p>Know why shadows have the same shape as the object that casts them.</p> <p>Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.</p>	<p>Experiment with kaleidoscopes and light spectrums.</p> <p>Use filters to experiment with different colours of light.</p> <p>Look at optical illusions.</p> <p>Analyse a diagram of an eye.</p> <p>Use mirrors to create reflections.</p> <p>Draw outlines round shadows.</p> <p>Try bending light or a laser using mirrors.</p>	<p>This is the final unit of light and looks at more complex and abstract ideas such as how the light source travels from objects to the eye and how light travels. The children will also focus on refraction, reflection and the colour spectrum. It is a good opportunity to revise shadows, solar power and the movement of the earth round the sun to clear up any misconceptions. It also gives a good opportunity for children to be able to go outside to do that learning and do practical inquiries using the natural daylight.</p>
<p>Animals Inc. humans - Autumn 2</p>	<p>Identify and name the main parts of the human circulatory system.</p>	<p>Dramatize going round the circulatory system.</p>	<p>This is the last unit of animals including humans, in which the children learn about the human circulatory system</p>

<p><i>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.</i></p>	<p>Know the function of the heart, blood vessels and blood. Know the impact of diet, exercise, drugs and lifestyle on health. Know the ways in which nutrients and water are transported in animals, including humans.</p>	<p>Look at diagrams of the heart and blood vessels. Keep a food and exercise diary. Measure pulse after exercise and compare in class. Dissect plants to look at channels for water and nutrients.</p>	<p>and the heart. They learn about the impact of diet and exercise and lifestyle on the body, plus looking at transportation of water and nutrients in animals and humans. This unit links back to when they were in year 3 and looking at transportation of water in plants and the several units where healthy diet has been looked at in different year groups. In key stage 3, they look again at the circulatory system and transportation of water on a cellular level, so it is important that the children have a good understanding of these concepts before entering secondary school.</p>
<p>Electricity - Spring 1 <i>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.</i></p>	<p>Compare and give reasons for why components work and do not work in a circuit. Draw circuit diagrams using correct symbols. Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer.</p>	<p>Create circuits for a purpose e.g. light up a house, football stadium. Create circuits that do not work, and children must work out what is wrong and how to fix them. Experiment using different size batteries and voltages e.g. observe what happens the more bulbs you add to a circuit.</p>	<p>Whilst the children were in year 4, they learned about different components that are used in a circuit and their functions whilst experimenting with how a circuit can work. in year 6, the children take this base knowledge and build on it to work out why there are variations in how components function for example brightness or loudness by referring to the current in the circuit. There is also greater understanding of voltage which will be useful for when the children go into key stage 3 and learn about amplitude and voltage together.</p>

<p>Living things and their habitats - Spring 2 <i>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.</i> <i>Give reasons for classifying plants and animals based on specific characteristics.</i></p>	<p>Classify living things into broad groups according to observable characteristics and based on similarities and differences. Know how living things have been classified Give reasons for classifying plants and animals in a specific way.</p>	<p>Create fact files on different types of animals. Link with Darwin's origins of species. Grow mould in the classroom and look under a microscope. Grow mushrooms or fungi or go observe them in the Wild Garden.</p>	<p>In this final unit, the children should be extremely comfortable with classifying and organising animals and living things into groups based on their characteristics. They should be able to justify their choices and use the knowledge from previous years including animal types, habitats and observable similarities and differences to argue their case. In this year, they will also look at microorganisms, the genus of animals and look at how to classify plants in a similar fashion.</p>
<p>Evolution and Inheritance - Summer 1 <i>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</i> <i>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</i> <i>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</i></p>	<p>Know how the Earth and living things have changed over time. Know how fossils can be used to find out about the past. Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents). Know how animals and plants are adapted to suit their environment. Link adaptation over time to evolution. Know about evolution and can explain what it is.</p>	<p>Watch programmes such as the Earth or Blue Planet to see how animals adapt to survive. Look at Darwin's origins of species Hire skulls from a museum to see how humans have evolved over time. Act out the demise of the Neanderthals versus the Homosapiens. Cross pollinate plants or look at varieties of same kind, see difference in colours of petals.</p>	<p>The last time that fossils was looked at was in year three as part of the rocks and soils unit, so it is a good opportunity for the children to relearn how fossils are made. The children will get a base understanding of genes and DNA plus how this links to reproduction and offspring in animals and plants. The children will also look at adaptation and evolution which does link to habitats and classification. This also links into the sex and relationships education unit in year 6 when considering the DNA of a sperm and an ovum.</p>