Archbishop Cranmer C of E Primary Academy
Science Curriculum

Curriculum Expectations:

Level Expected at the End of EYFS	Key Stage 1 National Curriculum Expectations: Working Scientifically	Lower Key Stage 2 National Curriculum Expectations: Working Scientifically	Upper Key Stage 2 National Curriculum Expectations: Working Scientifically
Understanding the World (The Natural World) • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. **Personal, Social and Emotional Development (Managing Self)** • Manage their own basic hygiene and personal needs, including dressing,	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.	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 a degree of trust in results, in oral and written forms such as displays and other presentations; • identifying scientific evidence that has been used to support or refute ideas or arguments.

going to the toilet and understanding the importance of healthy food choices.			

Intent

At Archbishop Cranmer, we follow Kapow Primary's Science scheme of work as the foundation to our curriculum planning. This scheme, written by experts, aims to develop a sense of excitement and curiosity about natural phenomena and an understanding of how the scientific community contributes to our past, present and future. We want pupils to develop a complex knowledge of Biology, Chemistry and Physics, but also adopt a broad range of skills in working scientifically and beyond. Our scheme of work is inclusive and meaningful, so all pupils may experience the joy of science and make associations between their science learning and their lives outside the classroom. Studying science allows children to appreciate how new knowledge and skills can be fundamental to solving arising global challenges. Our curriculum aims to encourage critical thinking and empower pupils to question the hows and whys of the world around them.

We encourage:

- A strong focus on developing knowledge alongside scientific skills across Biology, Chemistry and Physics.
- Curiosity and excitement about familiar and unknown observations.
- Challenging misconceptions and demystifying truths.
- Continuous progression by building on practical and investigative skills across all units.
- Critical thinking, with the ability to ask perceptive questions and explain and analyse evidence.
- Development of scientific literacy using wide-ranging, specialist vocabulary.

Implementation

Our scheme of work is designed with the following strands that run throughout:

- Scientific knowledge and understanding of:

Biology - living organisms and vital processes.
Chemistry - matter and its properties.
Physics - how the world we live in 'works'.

- Working scientifically - processes and methods of science to answer questions about the world around us.
- Science in action - uses and implications of science in the past, present and for the future.

By following Kapow Primary's Science scheme we ensure a spiral curriculum, with essential knowledge and skills revisited with increasing complexity, allowing pupils to revise and build on their previous learning. A range of engaging recall activities promote frequent pupil reflection on prior learning, ensuring new learning is approached with confidence. The Science in action strand is interwoven throughout the scheme to make the concepts and skills relevant to pupils and inspiring for their futures. Cross-curricular links are included throughout each unit, allowing children to make connections and apply their Science skills to other areas of learning.

To show progression throughout the school we have grouped the National curriculum content into six key areas of science:

Plants Animals, including humans
Living things and habitats
Materials
Energy
Forces, Earth and space.

In these, pupils explore knowledge and conceptual understanding through engaging activities and an introduction to relevant specialist vocabulary. The 'working scientifically' skills are integrated with conceptual understanding rather than being taught discretely. This provides frequent, but relevant, opportunities for developing scientific enquiry skills.

Impact

The expected impact of our Science scheme of work is that children will:

● Develop a body of foundational knowledge for the Biology topics in the National curriculum: Plants; Animals, Including Humans; Living Things and Their Habitats; Evolution and Inheritance.

● Develop a body of foundational knowledge for the Chemistry topics in the National curriculum: Everyday Materials; Uses of Everyday Materials; Properties and Changes of Materials; States of Matter; Rocks.

● Develop a body of foundational knowledge for the Physics topics in the National curriculum: Seasonal Changes; Forces and Magnets; Sound; Light; Electricity; Earth and Space.

● Be able to evaluate and identify the methods that 'real world' scientists use to develop and answer scientific questions.

● Identify and use equipment effectively to accurately gather, measure and record data.

● Be able to display and convey data in a variety of ways, including graphs.

● Analyse data in order to identify, classify, group, and find patterns.

● Use evidence to formulate explanations and conclusions.

● Demonstrate scientific literacy through presenting concepts and communicating ideas using scientific vocabulary.

● Understand the importance of resilience and a growth mindset, particularly in reference to scientific enquiry.

● Meet the end of key stage expectations outlined in the National curriculum for Science.

Impact is constantly monitored through both formative and summative assessment opportunities. Stickers containing the Up2 (learning objective) and Go4 (steps to success) are used within individual lessons to provide ongoing formative assessment of pupil outcomes. Verbal feedback and opportunities for rich discussion in every lesson also provide teachers with informative assessment for learning opportunities to adapt and monitor learning outcomes. Attainment and progress is measured across the school using HeadStart end of unit tests, which also allow us to address any gaps in knowledge. HeadStart progress tests, undertaken termly, show progress throughout the year.

Our pupils should leave school equipped with a range of skills to enable them to succeed in their secondary education.

Archbishop Cranmer C of E Primary Academy

Science Unit overview

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2	
EYFS	Human Bodies – All About Me	Light and Dark Cold and Hot	Lifecycles	Growth	Teeth	Mini- Beasts	
Year 1	Seasonal Changes	Everyday Materials	Sensitive Bodies	Comparing Animals	Introduction to Plants		
Year 2	Habitats	Microhabitats	Uses of Everyday Materials	Life Cycles and Health	Plant Growth		
Year 3	Movement and Nutrition	Forces and Magnets	Rocks and Soil	Light and Shadows	Plant Reproduction		
Year 4	Digestion and Food	Electricity and Circuits	Classification and Changing Habitats	States of Matter	Sounds and Vibrations		
Year 5	Earth and Space	Imbalanced Forces	Mixtures and Separation	Properties and Changes	Life Cycles and Reproduction	Human Timeline	
Year 6	Classifying Big and Small	Light and Reflection	Evolution and Inheritance	Circuits, Batteries and Switches	Circulation and Exercise		

Archbishop Cranmer C of E Primary Academy
Science Long Term Plan Knowledge Progression

Plants - Progression of Knowledge							
	EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Plant Structure and Function	Observe how plants grow, observe bulbs planted in the Spring. Labelling parts of a plant Knowing the different leaves and their fruit from trees. Conkers – Horse Chestnut Acorns - Oak Ash Keys - Ash Helicopters- Sycamore Autumn Workshop – Interactive visitor- Old Barn Field Farm.	To know a variety of common plants, and how they differ. To know deciduous trees lose their leaves seasonally, but evergreen trees do not. To know the basic structure (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants, including flowering plants and trees.		To understand the functions of the basic parts of a plant and the relationship between structure and function. To know that water is transported within a plant from the root, through the stem, to the leaves.			

Plant Growth and Needs	To take a plant seed home to grow at home. Spring Term- Sunflower challenge.	To begin to understand how plants grow and change over time.	To know that seeds and bulbs grow into seedlings by producing roots and shoots. To know that seedlings grow into mature plants by developing parts, that may include stems/trunks, leaves, flowers and fruits. To know that seeds need water to germinate. To know that plants need water, light and a suitable temperature for growth and health.	To know that plants need water, light, air, nutrients/fertilizer and a suitable temperature for growth and health. To understand that the needs for growth and health vary from plant to plant.			
Plant Life Cycle	To make a simple lifecycle from seed to shoot to flower. This evidence to be shown in the Spring- during our Lifecycle topic. Observing the changing of seasons, spotting flowers growing.			To know the life cycle of a plant from seed to mature plant. To know that flowers are the reproductive organ of a plant. To know that the process of pollination is the transfer of pollen to the female (part of the) flower. To know that the process of seed formation is the growth of a seed after pollination/fertilisation.		To compare asexual and sexual reproduction in plants.	

				To know some different methods of seed dispersal and the benefits of each.			

Animals including Humans - Progression of Knowledge

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animal Growth	To know how we grow from babies to adults. To know lifecycles of creatures. Real life studies. Chicks to Chickens. Tadpoles to frogs. Caterpillar to butterflies.	To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals).	To understand how living things change, and that animals have offspring that grow into adults. To know which offspring comes from which parent animal. To know the stages in some animal life cycles.			To describe the human life cycle, including the stages of growth and development (baby, toddler, child, teenager, adult, elderly). To describe changes that occur during puberty (in boys and girls). To know that gestation periods vary across mammals.	
Animal Structure and Function	To know parts of the human body (including head, neck, arms, elbows, legs, knees, face, ear, eyes, hair, mouth, teeth) Labelling a skeleton To have a Doctors Role Play area with x ray photos with the different parts of the body labelled To carry out simple experiments to demonstrate the different senses-taste, touch, smell, sight, hearing.	To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell) To know key parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth). To know the five main senses: sight, smell, hearing, taste and touch. To know that eyes are used for sight, the nose is used for smell, ears are used for hearing, the tongue and mouth are used for taste and the skin is used for touch.		To know that animals can be grouped based on the presence of a skeleton. To know that the skeleton in humans and some animals is used for movement, protection and support. To know that the muscular system in humans and some animals works with the skeleton for movement. To know the main bones in the body.	To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions. To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions.		To know the main parts of the human circulatory system (heart, blood vessels and blood). To know that the heart pumps blood around the body. To know that the blood vessels transport blood around the body. To know that the blood transports vital substances around the body, including oxygen and nutrients. To understand the relationships between different organ systems.
Health	To know what a healthy meal is. What kinds of foods are healthy?	To know that a carnivore is an animal that eats other animals and to give some examples.	To know that animals, including humans, need water, food and air to survive.	To know that animals, including humans, need the right types and amount of nutrition.	To know that teeth can be damaged, including the		To understand the impact of diet, exercise, drugs and lifestyle on the way a body

	To know how to look after our bodies by getting good sleep, exercise, good food.	To know that a herbivore is an animal that eats only plants and to give some examples. To know that an omnivore is an animal that eats both animals and plants, and to give some examples.	To understand the importance of exercise, a balanced diet and hygiene for humans.	To understand that humans cannot make their own food and therefore eat to get the nutrition needed. To know the main food groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions. To know that a balanced diet should include all food groups. To describe the diets of different animals.	effect of sugary and acidic food. To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly. To describe the teeth of carnivores and herbivores, and understand why they are different. To know that predators hunt for their food and prey are the animals being hunted. To know that producers make their own food. To know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on.		functions. To know that the heart rate is the number of beats per minute and breathing rate is the number of breaths per minute. To know that exercise increases heart and breathing rates.
Living Things and Their Habitats - Progression of Knowledge							
	EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**

Characteristics of Living Things	To know the different names of minibeasts. To make bug hotels and to design habitats suitable for different creatures. To explore how minibeasts are adapted to the environment.		To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition. To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes.		To know that living things can be grouped in different ways. To know that a classification key can be used to group and identify plants and animals. To know that vertebrates are animals which have a backbone and invertebrates are animals which do not have a backbone. To know that plants can be grouped into flowering or non-flowering varieties. To know that flowering plants include grasses and non-flowering plants includes ferns and mosses. To know that there are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish. To know that invertebrate groups include snails, slugs, worms, spiders and insects		To know that 'organism' is a term used to refer to an individual living thing. To know that micro-organisms are incredibly small and cannot usually be seen by the naked eye. To know the characteristics of the different groups of vertebrates and commonly found invertebrates.

Variation and Inheritance			To know a variety of plants and animals and describe some differences.			To know that a life cycle shows the changes an animal or plant goes through until the reproduction of a new generation when the cycle starts again. To know that all living things must reproduce for the species to survive. To know that sexual reproduction requires two parents, whereas asexual reproduction only requires one parent. To know that there are different processes plants and animals use to reproduce (asexual and sexual reproduction).	To know that living things have changed over time. To know that fossils provide us with information about living things that inhabited the Earth millions of years ago. To know that characteristics are passed from parents to their offspring, but that all offspring vary from their parents. To know that over time, variation in offspring can affect animals' chances of survival in particular environments.
Habitats and Interdependence			To name a variety of habitats, including woodland, ocean, rainforest and seashore. To know that a habitat is the environment where an animal or plant lives/ grows, because it provides what they need to survive. To know that a micro-habitat is a very small		To know that habitats can change throughout the year and this can be dangerous for living things. To know that humans can have both a positive and negative impact on the environment.		To know that animals and plants have adapted to suit their environment over many millions of years and that this process can be called evolution.

			habitat (e.g. stones, logs and leaf litter). To know that living things depend upon each other (e.g. for food, shelter.) To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals.				

Materials - Progression of Knowledge							
	EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Identifying and Naming		To know that objects are items or things. To know that a material is what an object is made from. To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.		To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.) To know that rocks may contain grains, crystals or fossils. To know that grains and crystals appear differently and can be used to classify rocks. To know that soils are made from rocks and dead matter.	To know that all substances around us can exist as solids, liquids and gases.		

Properties and Uses		To know that property refers to how a material can be described. To describe the physical properties of a variety of everyday materials. To understand that materials can be grouped based on their physical properties.	To know why objects are made from particular materials and to give examples of their suitability. To know that one material can be used for a range of purposes (and to give examples.) To know that different materials can be used for the same purpose (and to give examples.) To know why certain materials are unsuitable for particular objects.	To understand the relationship between the properties of rocks and their uses.	To know that a property of a solid is that it keeps its shape unless a force is applied to it. To know that a property of a liquid can flow freely and take on the shape of a container. To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.	To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.	
Change			To know that a force must be applied to change the shape of a solid object. To know that solid objects can be squashed, bent, twisted or stretched. To know that different solid objects may take a different amount of force to change shape.	To know that fossils can form from the remains of living things. To know that rocks can change over time (e.g. erosion, weathering).	To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating). To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing). To know that water can exist as a solid, a liquid or a gas.	To know that some substances will dissolve in a liquid to form a solution. To know the factors that affect the time taken to dissolve, including temperature and stirring. To understand that dissolving, mixing and changes of state are reversible changes. To know that some liquids and solids can be separated using sieving, filtering and evaporation and to describe these	

					To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius. To know that water flows around the world in a continuous process called the water cycle. To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour. To know that in the water cycle, condensation is the process of water vapour cooling to form water droplets in clouds, which can result in precipitation. To know that the rate of evaporation	processes. To understand that some changes result in the formation of new materials and that these are usually irreversible. (e.g. burning, rusting, the action of acid on bicarbonate of soda.)	

					increases as temperature rises.		

Energy - Progression of Knowledge

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sources	To know about the different sources of light that are available. To know that light travels from a light source.			To know that light travels from a source (e.g. the Sun, light bulbs and torches). To know that light travels in a straight line from a light source. To know that light is needed to see things and that dark is the absence of light. To know that light from the Sun can be dangerous and how to protect their eyes.	**Sound and Vibrations** To understand that sound is a result of vibrations. **Electricity and Circuits** To know that all electrical appliances need a power source, including batteries or mains electricity. To know that an electrical circuit needs a complete path for the electric charge to flow through. To know the main components in a simple series circuit. To know the precautions for working safely with electricity		**Light and Reflection** To know that light travels in waves but that it appears to travel in a straight line. **Circuits, batteries and switches** To know a wider variety of components in a series circuit (including buzzer and motor). To know the conventions used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.

Transfer				To know that materials reflect light. To know that light is reflected uniformly from a shiny surface, such as a mirror. To know that shadows are formed when the light from a light source is blocked by an opaque object.	**Sound and Vibrations** To know that vibrations from sounds travel through mediums to the ear. To know that an insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds. To know that different materials provide different amounts of insulation against sound **Electricity and Circuits** To know that some materials allow electric charge to pass through them easily and these are known as electrical conductors (e.g. metals). To know that some materials do not allow electric charge to pass		**Light and Reflection** To know that shiny surfaces reflect light uniformly whereas dull surfaces scatter the reflected light. To understand that luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye. To understand why shadows have the same shape as the objects that cast them. To understand relationships between light sources, objects and shadows. To know that when light is reflected off a surface, its direction changes. To know how a periscope works using reflection of light on plane surfaces.

					through them and these are known as electrical insulators (e.g. wood and plastic). To know that metals are used for cables and wires because they are good conductors of electricity. To know that plastic is used to cover cables and wires because it is a good insulator.		
Factors affecting energy				To understand how and why shadows change. To know that shadows change position and length throughout the day as the Sun changes position in the sky.	**Sound and Vibrations** To know a variety of ways to change the pitch or volume of a sound. To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds. To know that stronger vibrations cause louder sounds and weaker		**Light and Reflection** To know how light is reflected from a plane surface. To understand how the angle of a reflected ray is affected by the angle of the incoming ray, when reflected from a plane surface. **Circuits, batteries and switches** To know that the voltage of a circuit can be changed and how this affects bulb brightness (or buzzer volume).

					vibrations cause quieter sounds. To know that sounds get fainter as the distance from the sound source increases. **Electricity and circuits** To understand that an open switch breaks a series circuit so the components will be off. To understand that a closed switch completes a series circuit so the components will be on. To understand the relationship between bulb brightness and the number of cells in a circuit.		

Forces, Earth and Space - Progression of Knowledge							
	EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Key Facts	To know the name of the four seasons, Autumn and Winter, Spring and Summer. To identify changing seasons and the different states, what do children observe in the environment.	To know the name and order of the four seasons; spring, summer, autumn and winter. To know that it is unsafe to look directly at the Sun.		To know some examples of contact and non-contact forces. To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism). To know the North and South poles of a magnet. To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other. To know some different examples of magnets, including bar,		**Earth and Space** To know that the Sun is a star at the centre of our solar system. To know that the Sun, Earth and Moon are approximately spherical bodies. To know the names, order and relative positions of the planets and other main celestial bodies. To know that a moon is a celestial body that orbits a planet and give examples of moons that orbit other planets. **Imbalanced forces** To know that gravity is a non-contact force that pulls objects together.	

				horseshoe, button and ring, To know some uses of magnets.		To know that air resistance and water resistance are both types of friction.	

Forces in Motion	To know that cars and vehicles can move when force is applied to them.	To know weather associated with the four seasons and how it changes (in the UK). To understand that day length varies across the four seasons, with fewer daylight hours in the winter and more in the summer.		To know that friction is a contact force that acts between two surfaces to slow an object down. To know that magnetism is a non-contact force that affects objects containing magnetic metal. To understand that the opposite poles of a magnet attract one another and like poles repel one another.		**Earth and Space** To know that the Earth and other planets orbit around the Sun. To know that the tilt of the Earth and its orbit around the Sun causes the seasons. To know that the Moon orbits around the Earth. To understand how the Earth's rotation causes day and night and the apparent movement of the Sun across the sky. **Imbalanced Forces** To know that unsupported objects fall towards the Earth because of gravity. To know that friction, air resistance and water resistance act in the opposite direction to a moving object. To know that when forces are imbalanced, the	

						To know that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	
Factors affecting Forces	To know that gradient of slopes will affect how far cars will travel. Play based experiments during continuous play.			To know that rougher surfaces have more friction between them than smoother surfaces. To understand that the strength of different magnets may vary.		**Imbalanced Forces** To know that rougher surfaces have more friction between them than smoother surfaces and how that may affect movement. To know that the larger the surface area of an object the greater the air or water resistance it creates.	

Working Scientifically - Progression of Skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Posing Questions	Making a question about how and why things happen? Asking questions about how you can affect the change that happens in an experiment	Exploring the world around them and raising their own simple questions. Recognising there are different types of enquiry (ways to answer a question). Responding to suggestions of how to answer their questions.		Beginning to raise further questions during the enquiry process. Considering what makes a testable question. Beginning to recognise that there are different types of enquiry and that they are suitable for different questions. Beginning to make suggestions about how different questions could be answered		Raising questions throughout the enquiry process. Identifying testable questions. Selecting the most appropriate enquiry method to answer questions and give justification.	
Planning	Plan to carry out simple tests with support. Following a simple step of instructions.	Beginning to recognise whether a test is fair. With support, deciding if suggested observations are suitable. Ordering a simple method.		Beginning to select from options which variables will be changed, measured and controlled. Suggesting what observations to make and how long to make them for. Planning a simple method, verbally and in writing. Beginning to write a simple method in numbered steps. Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.		Suggesting which variables will be changed, measured and controlled. Making and explaining decisions about what observations to make and how long to make them for. Writing a method including detail about how to ensure control variables are kept the same Writing a method that considers reliability by planning repeated readings. Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.	

Predicting	Begin to make a guess (prediction) about what may happen in a test situation.	Suggesting what might happen, often justifying with personal experience.	Making predictions about what they think will happen by: - Using scientific knowledge and/or personal experience to explain their prediction (because…) - Beginning to consider cause and effect when making predictions, where appropriate. - Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)	Making increasingly scientific predictions by: - Using previous scientific knowledge and evidence to inform their predictions. - Using scientific language to describe a potential outcome or explain why they think something will happen. - Making links between topics to evidence a prediction.
Observing (qualitative data)	Begin to use a bar chart to record and populate data, class teacher to make the graph based on results. Use of pictograms E,g, favourite food or method of transport to school.	Using their senses to describe, in simple terms, what they notice or what has changed.	Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.	Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.

Measuring (quantitative data)	Using cubes to measure the length of objects. Begin to use simple measuring tools like scales, metre sticks, rulers. Reading simple height charts in the classroom and on the playground.	Using non-standard units to measure and compare. Beginning to use standard units to measure and compare. Beginning to use simple measuring equipment to make approximate measurements. Reading simple numbered scales.	Using standard units to measure and compare. Using measuring equipment with increasing accuracy. Reading scales with unmarked intervals between numbers.	Using standard units to measure and compare with increasing precision (decimals). Reading a wider variety of scales with unmarked intervals between numbers.
Researching	Listening to songs about non-fiction themes to do with science.	Gathering specific information from one simplified, specified source.	Gathering specific information from a variety of sources.	Gathering answers to open-ended questions from a variety of sources.

Recording (diagrams)		Drawing and labelling simple diagrams.	Beginning to draw more scientific diagrams by: - Using some standard symbols. - Drawing in 2D to produce simple line diagrams. - Labelling with more scientific vocabulary	Drawing scientific diagrams by: - Using a wider range of standard symbols. - Drawing with increasing accuracy. - Labelling with a broader range of scientific vocabulary. - Annotating diagrams to explain concepts and convey opinions.
Recording (tables)		Using a prepared table to record results including: - Numbers. - Simple observations. - Tally frequency.	Using a prepared table to record results including more detailed observations. Using tables with more than two columns. Identifying and adding headings to tables. Beginning to design simple results tables.	Using tables with columns that allow for repeat readings. Suggesting headings to tables, including units. Designing results tables with increasing independence with consideration of variables where applicable. Calculating the mean average.

Grouping and Classifying		Grouping based on visible characteristics. Organising questions to create a simple classification key.	Grouping based on visible characteristics and measurable properties. Populating a pre-prepared branching and number key. Choosing appropriate questions for classification keys	Grouping in a broader range of contexts. Organising the layout of number and branching keys Formulating appropriate questions for classification keys.
Graphing		Representing data using pictograms and block charts.	Representing data using bar charts. Drawing bars with greater accuracy. Reading the value of bars with greater accuracy.	Representing data by using line graphs and scatter graphs. Plotting points with greater accuracy. Reading the value of plotted points with greater accuracy.

Analysing and drawing conclusions		Using their results to answer simple questions. Beginning to recognise when results or observations do not match their predictions.	Writing a conclusion to summarise findings using simple scientific vocabulary. Beginning to suggest how one variable may have affected another. Beginning to quote results as evidence of relationships. Identifying data that does not fit a pattern (anomalous data). Recognising when results or observations do not match their predictions. Beginning to use identified patterns to predict new values or trends.	Writing a conclusion to summarise findings using increasingly complex scientific vocabulary. Suggesting with increasing independence how one variable may have affected another. Quoting relevant data as evidence of relationships. Identifying anomalies in repeat data and excluding results where appropriate. Comparing individual, class and/or model data to the prediction and recognising when they do not match. Using identified patterns to predict new values or trends.
Evaluating		Beginning to recognise whether a test is fair or not.	Beginning to identify steps in the method that need changing and suggest improvements. Beginning to identify which variables were difficult to control and suggesting how to better control them. Commenting on the degree of trust by reflecting on: - Results that do not fit a pattern (anomalies). - The quality of results (accurate measurements and maintaining control variables). Beginning to identify new questions that would further the enquiry.	Identifying steps in the method that need changing and suggesting improvements. Identifying which variables were difficult to control and suggesting how to better control them. Commenting on the degree of trust by also reflecting on: - Accuracy (human error with equipment). - Reliability (repeating results). - Sources of information (e.g. websites, books). Posing new questions in response to the data, that would extend the enquiry. Deciding what data to collect to further test direct relationships.

Science in Action - Progression of Skills

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	To know about famous scientists throughout history. To know about a range of jobs and careers that use scientific knowledge and methods. To know about the work of modern day scientists. To know about science in the news and recent discoveries. To explore spiritual, moral, social and cultural links with Science.					
			To know about the methods and equipment used by scientists throughout history and how these have led to modern methods. To understand how scientific knowledge has changed over time, leading to the current understanding of Science. To know about current scientific research and what it aims to achieve in the future. To understand that mistakes can lead to new discoveries. To know that collaboration and peer reviewing is essential for effective scientific progress.			
					To understand how scientific evidence is used to support or refute ideas or arguments.	