Matlock and Dales Primary Partnership

Science

Intent, Implementation and Impact Statement

	Key Points
Our Intent	At the Matlock and Dales Primary Partnership, we aim to provide a curriculum which enables our children to: know more, experience more, remember more and do more. We believe that providing an engaging Science curriculum will develop children's curiosity, interest, knowledge and understanding of their immediate environment as well as the world beyond school. We endeavor to help our pupils develop their knowledge of scientific ideas by using scientific enquiry in order to answer their own questions. At the Matlock and Dales Primary Partnership, our aim is that through stimulating and challenging experiences, children will secure and extend their scientific knowledge skills and vocabulary. Providing these opportunities will ensure that our pupils are confident and curious learners who are developing the skills and knowledge to explore and conserve the world around them.
Our Implementation	At the Matlock and Dales Primary Partnership we recognise that our curriculum planning must allow for children to gain a progressively deeper level of knowledge, understanding, skill competency, and Scientific vocabulary as they move throughout the school. The Science curriculum map below is used to see the progression of Science skills across the federation and therefore the prior learning and post learning objectives for the area of Science being planned and taught. Systematic enquiry opportunities are provided in Foundation Stage, based upon all areas of Development Matters, but primarily in 'Understanding the World'.

	At the Matlock and Dales Primary Partnership, Key stage 1 and 2 Science is taught as a discrete subject as well as alongside other subjects using a topic-based approach. In Foundation Stage, opportunities for scientific enquiry occur throughout continuous provision, most particularly in our Investigation Station area. We use a variety of teaching and learning styles in Science lessons and Foundation Stage provision. Our principal aim is to develop the children's knowledge, skills and understanding in Science. In key stage 1 and 2, we believe in whole-class teaching methods and where possible combine these with practical investigations and experiments: scientific enquiry is a key part of the curriculum. In Foundation Stage we use a combination of topic-related and child-centered learning to facilitate our children's enquiry skills.
The Impact	The impact and measure of this is to ensure that our children progress to reach their full potential as they know more, experience more, remember more and do more.

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum	**Understanding the World** Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the	**Plants** Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a	**Living things and their habitats** Explore and compare the differences between things that are living, dead and things that have never been alive.	**Plants** To identify and describe the functions of different parts of flowering plants—roots, stem / trunk, leaves and flowers.	**Living things and their habitats** To recognise that living things can be grouped in a variety of ways. -To explore and use classification keys to help group,	**Living things and their habitats** To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	**Living things and their habitats** - To describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including

	world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension. **Understanding the World** **ELG: The Natural World** Children at the expected level of development will: - 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; -	variety of common flowering plants, including trees. **Animals, including humans** Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals. **Everyday materials** -Distinguish between an object and the material from which it is made. -Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. -Describe the simple physical properties of a variety of everyday	Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including micro-habitats. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain and identify and name different sources of food. **Plants** Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and suitable temperature to grow and stay healthy.	To investigate the way in which water is transported within plants. -To explore the part that flowers play in the life cycle of flowering plants including pollination, seed formation and seed dispersal. **Animals, including humans** - To identify that humans need the right types and amount of nutrition and that they cannot make their own food; they get nutrition from what they eat. - To identify that humans have skeletons and muscles for support, protection and movement. **Rocks** - To compare and group together different kinds of rocks based on their appearance	identify and name a variety of living things in their local and wider environment. -To recognise that environments can change and that this can sometimes pose dangers to living things **Animals including humans** -To describe the simple functions of the basic parts of the digestive system in humans. -To identify the different types of teeth in humans and their simple functions. **States of matter** -To compare and group materials together, according to whether they are solids, liquids or gases. -To observe that some materials change state when they are heated or	To describe the life process of reproduction in some plants and animals. **Animals including humans** To describe the changes as humans develop to old age. **Properties and changes of Materials** To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. To know that some materials will dissolve in liquid to form a solution, and describe how	micro-organisms, plants and animals. To give reasons for classifying plants and animals based on specific characteristics. **Animals including humans** - To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. To describe the ways in which nutrients and water are transported within animals, including humans. . - **Light** **To recognise that light**

	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 ELG: Managing Self** Children at the expected level of development will: - Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.	materials. -Compare and group together a variety of everyday materials on the basis of their simple physical properties. **Seasonal changes** -Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.	**Animals, including humans** Notice that animals, including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, including humans, for survival (Water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. **Uses of everyday materials** Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and	and simple physical properties. To describe in simple terms how fossils are formed when things that have lived are trapped within rocks. -To recognise that soils are made from rocks and organic matter. **Light** -To recognise that they need light in order to see things and that dark is the absence of light. -To notice that light is reflected from surfaces. -To recognise that light from the sun can be dangerous and that there are ways to protect their eyes. -To recognise that shadows are formed when the light from a light source is blocked by a solid object. -To find patterns in the way that the size of shadows	cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) -To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature **Sound** -To identify how sounds are made, associating some of them with something vibrating. -To recognise that vibrations from sounds travel through a medium to the ear. -To find patterns between the pitch of a sound and features of the object that produced it. -To find patterns between the volume of a sound and the strength of	to recover a substance from a solution. To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. To demonstrate that dissolving, mixing and changes of state are reversible changes. To explain that some changes result in the formation of new materials, and that this kind of change is not usually	**appears to travel in straight lines.** **To use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.** **To explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.** **To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.** **Evolution and Inheritance** **To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.**

			stretching.	change. **Forces and Magnets** -To compare how things move on different surfaces -To notice that some forces need contact between 2 objects, but magnetic forces can act at a distance -To observe how magnets attract or repel each other and attract some materials and not others -To compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials -To describe magnets as having 2 poles -To predict whether 2 magnets will attract or repel each other, depending on which poles are facing	the vibrations that produced it -To recognise that sounds get fainter as the distance from the sound source increases. **Electricity** -To identify common appliances that run on electricity. -To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. -To identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. -To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series	reversible, including changes associated with burning and the action of acid on bicarbonate of soda. **Earth and Space** To describe the movement of the Earth and other planets relative to the sun in the solar system. To describe the movement of the moon relative to the Earth. To describe the sun, Earth and moon as approximately spherical bodies. To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky . **Forces**	**To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.** **To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.** **Electricity** To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. To 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. To use recognised symbols when representing a simple circuit in a diagram.

					circuit. To recognise some common conductors and insulators, and associate metals with being good conductors.	**To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.** **To identify the effects of air resistance, water resistance and friction, that act between moving surfaces.** **To recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.**	
	Pupils should be taught about: Working Scientifically: • Using magnifying glasses • Investigation of best places for plants to grow. • Cameras to record	Pupils should be taught about: Working Scientifically Asking simple questions and recognising that they can be answered in different ways. Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. Using their observations and ideas to suggest answers to questions. Gathering and recording data to help in		Pupils should be taught about: Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them Setting up simple practical enquiries, comparative and fair tests Making systematic and careful observations and, where appropriate, taking accurate measurements using		Pupils should be taught about: Working Scientifically: planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Taking measurements, using a range of scientific equipment, with increasing accuracy and precision taking repeat readings when appropriate	

	growth.	answering questions.		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		Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Using test results to make predictions to set up further comparative and fair tests Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Identifying scientific evidence that has been used to support or refute ideas or arguments.	
Learning (fundamental skills – what will constantly revisited?)	**Plants** To know where plants grow best Label parts of a plant Explore plants and seeds Looking after and recording growth **Animals, including humans** Key facts about common animals – diet and habitat	**Animals including humans** Identify fish, amphibians, reptiles, birds and mammals and classify as carnivores, herbivores and omnivores and **Properties and**	**Living things and their habitats** To identify the definition of a living thing, their food chains and habitats **Animals including humans**	**Animals including humans** To identify the nutritional needs of humans and the purpose of skeletons and muscles **Light** To recognise light is	**Living things and their habitats** To use classification keys to recognise that living things can be grouped To explore environmental changes and	**Living things and their habitats** Describe and compare lifestyles of animals and plants **Animals**	**Living things and their habitats** To describe how living things are classified and the reasons for this **Animals including humans**

	How to keep happy and healthy Life cycle of an animal Healthy eating Exploring senses **Living things and their habitats** Explore various different habitats and the animals that live there **Everyday materials** **Floating and sinking** **Recycling** **Explore magnets** **Explore ice and changes of state** **Using torches and mirrors** **Using senses to describe materials** **Seasonal changes** Autumn walk – observe changes throughout the seasons Explore why do leaves fall Describe signs of Spring, Summer, Autumn and Winter Identify appropriate	**changes of materials** Know that an object is different from its material. Identify, name and describe, group and compare a variety of every day materials. **Plants** To identify, name and describe the basic structure of a variety of common wild and garden plants including deciduous and evergreen trees **Seasonal changes** Observe and describe the changes in weather and day length across the season	To know that animals and humans reproduce, describe their basic needs of survival and the importance of a healthy lifestyle. **Properties and changes of materials** Link to properties of materials to their uses. Explore how solid objects can change shape **Plants** To observe and describe how seeds and bulbs grow To know what plants need to grow and stay healthy	reflected from surfaces and we need light to see things. Sunlight can be dangerous To understand how shadows are formed and what makes them change. **Forces and magnets** To compare how things move on different surfaces To explore and predict how magnets attract and repel each other and a variety of every day materials referring to their poles. **Rocks** Compare and group rocks on their properties Describe how fossils are formed To know what soil is made from	dangers **Animals including humans** Describe the basic functions of the digestive system and types of teeth and their functions **Electricity** To identify electrical appliances To construct and identify the components of a simple series circuit. To recognise conductors and insulators **Sound** To know that sounds are caused by vibrations and how they travel. Find patterns in pitch and volume of sound	**including humans** Describe the changes as humans develop to old age **Properties and changes of materials** Compare and group materials on the basis of their properties. To know the definition of a solid, liquid and gas. To know what a solution is and to explore filtering, sieving, dissolving and evaporation. To explore reversable and irreversible changes. **Earth and Space** Know that the sun, earth and moon are approximately	To identify and describe the functions of the main parts of the circulatory system. To recognise the impact of lifestyle on how the body functions To describe the ways in which nutrients and water are transported within animals and humans **Evolution and inheritance** To recognised that living things have changed and adapted over time to suit their environment and this may lead to evolution To recognise that living things normally produce offspring which are not identical to their parents **Electricity** To know that the number and voltage of cells effects the components in a circuit and to compare and give reasons for this. To recognise circuit symbols

	clothing for the weather/season			**Plants** To identify and describe the function of different parts of flowering plants as well as investigation water transportation To explore the life cycle of flowering plants	**States of matter** To identify and group solids, liquids and gases To measure explore how temperature effects the state of materials. To understand the water cycle	spherical bodies and describe their movement relative to the sun and each other To be able to explain day and night **Forces** Understand the force of gravity Identify the effects of air resistance, water resistance and friction Understand the effect of some mechanisms and forces	**Light** To recognise light travels in straight lines from an object to our eye. To explain why shadows have the same shape as the object casting them.
Vocab	Plants, seeds, sunlight, water, root Animal, human Float, sink, magnet, ice, freeze, melt, smooth, rough Spring, summer, autumn, winter, rain, snow, wind, sun	Fish, amphibian, reptile, mammal, bird, herbivore, Head, brain, body, ear, sound, tongue, taste Material, fabric, wood, plastic, metal Seed, plant, stem, petal, vegetable, fruit Season, spring, summer, autumn, winter, hibernate, temperature, weather	healthy, protein, carbohydrate, protein, dairy, fat, exercise Lifecycle, offspring, reproduction, Reproduce, habitat, survive, producer, consumer rainforest, endangered, ocean, desert, Arctic carbon dioxide, oxygen, germination	Vitamin, mineral, balanced, rib cage, spine, nutrition Light, shadow, ray, reflect Force, friction, magnet, attract, repel, magnetic field Igneous, sedimentary, metamorphic, magma, fossil photosynthesis,	adapted, camouflage, classify, ecosystem digestive system, incisors, molars, consumer, predator electricity, batteries, circuit, bulb, switch, conductor, insulator vibration, volume, pitch	reproduction, fertilisation, endangered, organism offspring, dependent, adolescent, solution, reversible, irreversible, solar system, orbit, phase, axis gravity, water resistance, friction,	classification, microorganism, species, ecosystem, circulatory system, diet, pulse, atrium, ventricle, vessel, valve Inherit, adaptation, evolved, ancestor, circuit, battery, electricity, resistor, output, conductor, insulator

			Material, property, stretchy, force, bend	anther, filament, pollen, nectar	thermometer, solid, liquid, gas, evaporation, condensation	newton	light source, reflected, angle, mirror, opaque, transparent,
Key Scientists	David Attenborough (Biologist)	Alexander Von Humboldt (Botanist and adventurer)	Jane Goodall (Conservation and animal welfare)	Mary Anning (palaeontologist)	Nikola Tesla (Electrical engineer)	Mae Jemison (first black woman to travel into space)	Charles Darwin (Evolution) Rosalind Franklin (discovered DNA)
Approach to assessment	Trial out pre unit key questions linked to prior learning to see what children have remembered and address any misconceptions eg. What do you already know? What do you want to find out? Key vocabulary from previous linked topics taught. Trial out using end of topic quiz/test (developing experts). Continue end of term science tests during Assessment Week (Christmas and Easter) for KS2. Ongoing teacher assessment during lessons to address misconceptions and ensure consolidation of knowledge. During lessons and investigations teachers will use questioning to assess eg. How will you make sure it is a fair test?						
Key learning - Sticky knowledge	I know how to make observations and draw pictures of animals and plants. I know some similarities and differences between the world where I live and other environments. I know there are seasons. I know materials can change – ice melting/freezing.	Working scientifically: I know how to ask questions, make observations and perform simple tests I know how to gather and record data		Working scientifically: I can conduct simple practical enquiries using fair testing, taking accurate measurements and using a range of equipment. I can record and use findings to draw conclusions and answer scientific questions.		Working scientifically: I can plan different types of scientific investigate and take measurements with increasing precision and accuracy. I can record data, report findings and identify how scientific evidence has been used to support or refute evidence.	
		Plants: I can name common plants, including deciduous and evergreen trees, and describe their	Plants: I know how plants grow and the conditions required for them to remain	Plants: I can identify the parts, function and lifecycle of flowering plants; I			

		structure.	healthy.	can investigate water transportation in plants.			
		Animals including humans: I can name common animals and identify their type; name carnivores, herbivores and omnivores and compare their structure. I can identify, name and label the basic parts of the human body and link them to senses.	Animals including humans: I know animals have offspring and grow into adults; I understand the needs of animals and can describe the importance of living a healthy lifestyle.	Animals including humans: I know animals get nutrition from what they eat; I understanding that humans and other animals have a skeleton and muscles for movement, support and protection.	Animals including humans: I can describe the functions of different parts of the digestive system; I name different types of human teeth and can construct and interpret food chains.	Animals including humans: I know how humans change as they age.	Animals including humans: I can name the main parts of the human circulatory system; I can describe how nutrients are supported in animals including humans and the impact of diet, exercise, drugs and lifestyle on the human body.
			Living things and their habitats: I know the difference between things that are living, dead and have never been alive; I can identify habitats and living things that inhabit them; I can describe a simple food chain.		Living things and their habitats: I can group living things and use classification keys; I recognise that environments change and can threaten living things.	Living things and their habitats: I can describe differences in the lifecycle of a mammal, amphibian, insect and bird; I can describe the process of reproduction in some plants and animals.	Living things and their habitats: I know living things are classified into broad groups; I can give reasons for classifying plants and animals based on characteristics.
		Materials and states of matter: I can identify a variety of everyday materials (wood, plastic, glass, metal, water, rock);	Materials and states of matter: I can identify and compare the suitability of different everyday		Materials and states of matter: I can compare materials based on states of matter (liquid, solid, gas); I	Materials and states of matter: I can compare materials based on properties (hardness,	

		describe their properties and make comparisons.	materials; I can change everyday materials by squashing, bending, twisting and stretching.		can observe changes of state and link this to the water cycle.	solubility, transparency, conductivity, magnetism); I can investigate separating materials including through dissolving and condensation and know there are reversible and irreversible changes.	
				Light and sound: I know that light is needed to see and dark is the absence of light; I can observe and investigate shows and reflection; I know it is harmful to look at the sun.	Light and sound: I know that sound is vibrations and can investigate how it travels; I can link sound vibrations to pitch and volume.		Light and sound: I know that light appears to travel in straight lines; I can explain why this means shadows have the same shape as the objects that cast them.
				Forces and magnets: I can investigate friction and magnetic forces; I know magnets have poles and can repel or attract.		Forces and magnets: I can explain the force of gravity; I can identify forces including air resistance, water resistance and friction; I know some mechanisms allow a smaller force to have a greater effect (levers, pulleys, gears).	

					Electricity: I can construct a simple circuit and investigate how it works; I can recognise conductors and insulators.		Electricity: I can investigate how voltage affects a circuit and use recognised symbols in a simple circuit diagram.
		Seasonal changes: I can name the seasons and describe how day length and weather relates to seasons.		Rocks: I can compare and group different types of rock (igneous, sedimentary, metamorphic); I can explain how fossils are formed and the structure of soil.		Earth and space: I can name and order the planets in our solar system; I can describe the movements of the planets, sun and moon and explain how this causes day and night.	Evolution and inheritance: I know that living things have changed over time; I understand the theory of natural selection and how this may lead to evolution.