

Science Curriculum Intentions



End of Year Curriculum Intent Statement

Year Group	End Point for Year Group
A Scientist in Ladybugs will...	<p>...experience: Explore the inside and outside classroom, including sights and smells. Observing closely what animals and people do. Experience collections of sets of items such as pine cones, wooden rings for children to explore how objects can be combined Tasting different food including cooking and react using facial expression.</p> <p>...be able to: Explore puddles, trees and surfaces such as grass, shiny surfaces and textures. Observe interesting things when they are looking around for example, looking up at the ceiling or peering into a corner.</p>
Key Vocabulary	Key assessment of learning questions
Extend children's vocabulary by introducing new terms by modelling Eg tree, wind, snow, cold	Observe children exploring using all of their senses and record
A Scientist in Mighty Oaks will...	<p>...experience: Teach skills and knowledge in the context of practical activities, e.g. learning about the characteristics of liquids and solids by involving children in melting chocolate or cooking eggs. Daily opportunities for sensory exploration through tuff spot activities</p> <p>...be able to:</p>

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	investigate and notice detailed features of the natural world e.g. streamers and bubbles to explore the effects of wind, magnifying glasses, magnets, torches
Key Vocabulary	Key assessment of learning questions
Find out, how, investigate, hot, cold, rough, smooth, melt, ice, change, grow	How? Why? What would happen if....?
Logical Progression Links to Enhance Long Term Memory (learning)	Forest school area/Base camp, outside area Walks through the seasons
A Scientist in Reception will...	<p>...experience: To make observations of animals at the farm, insects in the Forest and plants grown in the classroom(broad bean)</p> <p>Experience taking care of the flowerbeds</p> <p>...be able to:</p> <p>Ask and answer questions such as "How can we...?" or "What would happen if...?".</p> <p>Teach skills and knowledge in the context of practical activities, e.g. learning about the characteristics of liquids and solids by involving children in melting chocolate or cooking eggs.</p> <p>Use correct terms so that, e.g. children will enjoy naming a chrysalis if the practitioner uses its correct name.</p> <p>Name parts of a growing bean- root, shoot, stem, leaves</p> <p>To talk about changes such as babies growing, melting ice, plants growing, changes in seasons</p>



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Key Vocabulary		Key assessment of learning questions
<p>Living things Environment Plant Tree, shrub, Oak, acorn, conker, horse chestnut, nettles, blackberries Animal Insects, fish, mammal, bird, dinosaurs Observe and watch Grow Changes melting Material: wood, metal, glass, plastic Hard, soft, rough, smooth Magnets Magnifying glass Germs Clean</p>	<p>Seasons Summer Spring Autumn Winter Growing Leaf, stem, flower, seed, Weather ; rain, cloud, sunshine, snow, ice Sort Predict Explore Look, feel, touch Find Compare</p>	<p>How has it changed?, why has it changed?, What is it like now compared to before? Would happen if you put ice in your pocket? How is it fair? What is the same? What would happen if.... How can we find out? Which soap will make the most bubbles? How can we melt the ice quicker? Observe and give children opportunities to record findings</p>
Logical Progression Links to Enhance Long Term Memory (learning)		<p>Forest school area/Base camp, outside area Walks through the seasons. Enquiry tables. Adults model scientific investigations such as which soap makes the best bubbles, where is the best place to dry clothes</p>

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A Scientist in Year 1 will...

...know:

(Plants)

what is needed to grow a plant successfully from a seed or bulb.
the key parts of a plant and their function.
the names of common plants.

(Living things and their environments)

There are four seasons

The day length changes between the seasons.

(Animals including humans)

the meaning of amphibian, fish, reptile, bird, mammal, herbivore, carnivore, omnivore.

(Properties of Materials)

The names of everyday materials.

Different materials have different properties suitable for specific purposes.

parts of the human body.

what the five senses are.

how we have changed from a baby to adult.

...be able to:

(Plants)

explain the changes that occur (through observation) as the plant grows.

name the key parts of a plant.

distinguish between deciduous and evergreen trees

(Living things and their environments)

Identify colder climates and compare to their own climate.



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		<p>(Animals including humans) classify animals according to what type they are. classify animals according to their diet. label the parts of a human body and animal bodies. label the five senses and explain what they do. explain how we grow and develop from birth to old age.</p> <p>(Properties of Materials) identify and recognise different materials. explain materials properties and classify materials according to their properties. compare and group materials based on simple physical properties (Translucent, waterproof, absorbent etc.) Investigate a range of materials to identify their suitability for specific purposes.</p>
Key Vocabulary		Key assessment of learning questions
Animals Humans Senses Mammals Reptiles Fish Amphibians Birds Carnivores Herbivores	Deciduous Evergreen Leaves Flowers Blossom Petals Fruit Roots Bulb Seed	<p>What is the best material to make an umbrella?</p> <p>Can you sort the animals? (Discuss different category types). What type of animal is a _____? How do you know?</p> <p>My plant has died. What might be wrong?</p> <p>In what season would it be most likely to snow? (Geography link).</p>

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Omnivores Leg Arm Elbow Head Ear Nose Back Wings Beak Material Wood Plastic Glass Metal Paper Soft Bendy Rough Smooth Water Rock Properties <u>Introduce(National curriculum):</u> Translucent	Trunk Branches Stem Seasons Summer Spring Autumn Winter Sun Day Moon Night Light Dark	
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<p>Waterproof Absorbent Opaque Transparent</p>		
<p>Logical Progression Links to Enhance Long Term Memory (learning)</p>		<p>Attingham Park Nature Walks Forest School/Base Camp Exotic Zoo visit Chick hatching in school</p>
<p>A Scientist in Year 2 will...</p>		<p>...know:</p> <ul style="list-style-type: none"> • How conditions effect the growth of a plant • How plants grow to maturity • The names of common British plants and trees including annuals and perennials • What animals need to survive • The importance of exercise and a healthy lifestyle • Plants are alive • What MRS NERG stands for • What happens in a simple food chain • properties of materials and why they are useful • how materials can be changed, e.g. stretching, squashing, bending <p>...be able to:</p> <ul style="list-style-type: none"> • Plan and perform comparative and fair tests. • Observe changes using simple equipment and explain their findings. • Use their observations and ideas to answer questions • Identify and classify • Gather and record data



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- Compare groups, e.g. humans to animals

Key Vocabulary

Key assessment of learning questions

survival	seeds	hard	living
water	bulbs	soft	dead
air	water	stretchy	habitat
food	light	stiff	energy
adult	temperature	shiny	food chain
baby	growth	dull	predator
offspring		rough	prey
kitten		smooth	woodland
calf		bendy	pond
puppy		waterproof	desert
exercise		absorbent	
hygiene		opaque	
		transparent	
		brick	
		paper	
		fabric	
		squashing	
		bending	
		twisting	
		stretching	
		elastic	
		foil	

What does a living thing need to survive?
 What material would you use to make a teaspoon? Why?
 What would happen to a food chain if there were no plants?
 How does light effect the growth of a plant?



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Logical Progression Links to Enhance Long Term Memory (learning)	Traffic survey using data loggers Forest schools and base camp visits - habitats Grandparents gardening week Exotic zoo visit Chick hatching in school
A Scientist in Year 3 will...	...know: <ul style="list-style-type: none">• That seeds need nutrients and the right light and temperature to grow.• The functions of the main parts of a flowering plant.• How nutrients and water are transported through a plant.• How seeds are formed and dispersed to reproduce.• That plants can make their own food through photosynthesis.• The life cycle of a flowering plant. • The names of the different food groups and why they are important.• What herbivores, omnivores, carnivores, vertebrates and invertebrates are.• That animals live in different habitats as they have adapted to their environments.• The main parts and functions of the heart.• That muscles can be moved by voluntary or involuntary movements. • How sedimentary, metamorphic and igneous rocks are formed and what their properties are.• How fossils are formed and who Mary Anning is.• What the word permeable means.• That there are different layers of the earth. • How forces are used in everyday life. In particular friction.



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- That magnets create a force.
- That magnets have poles which can repel and attract each other.

- How shadows are formed.
- That some materials are reflective and how light is reflected.
- The properties of translucent, transparent and opaque materials.
- What the dangers of the sun are and how to protect ourselves from these.
- That light is needed in order to see things and darkness is created when the light source is removed.

...be able to:

- Perform a fair test.
- Use data loggers to record.
- Draw and present conclusions in the form of a final report.
- Be able to make observations and draw conclusions from these.
- Design healthy meals based on their knowledge of food groups.
- Classify and compare animals depending on their diet and habitat.
- Design animals that are adapted to suit particular habitats.
- Label the key parts of the heart.
- Gather data and record results following an investigation.
- Identify similarities and differences in results.
- Group rocks and soils depending on their properties and appearance.
- Use magnifying glasses to look carefully at rocks and soils.
- Compose questions about how rocks and soils are formed.
- Make predictions prior to an investigation.



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Key Vocabulary		Key assessment of learning questions
<p>Animals Including Humans: Skull, Bones, Nutrition, muscles, skeleton, Plants: Air, light, water, nutrients, soil, reproduction, transportation, pollination, dispersal, flower</p>	<p>Rocks: Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent Light: Light, shadows, mirrors, reflective, dark, reflection Forces and Magnets: Magnetic, Force, contact, attraction, repel, poles, push, pull</p>	<p>Rocks: How is a sedimentary rock formed? How is a metamorphic rock formed? How is an Igneous rock formed? Can you name a Rock which is absorbent? Plants: Can you describe how seeds are transported? Animals including Humans: What enables our bodies to move? Light: How are shadows formed? Forces and Magnets: How does magnetism work? Can you name a pushing force? Can you name a pulling force?</p>
<p>Logical Progression Links to Enhance Long Term Memory (learning)</p>		<p>Link to Stone Age -trip to Shrewsbury Museum Link to Geography -volcanoes and natural disasters RE link -light Animals -possible trip to Chester Zoo?</p>
<p>A Scientist in Year 4 will...</p>		<p>...know: Humans impact upon their environment in positive and negative ways. Function of parts of the human digestive system. Teeth types of humans and other animals and their relation to diet. Key vocabulary of food chains including, producer. The difference between vertebrates and invertebrates. Key parts of an insect's body. Melting and boiling point of water. How particles are arranged in solids, liquids and gases. Know that surface area, temperature and wind affect evaporation rates. That some objects use electricity and that some are mains powered. How a switch can interrupt the flow of electricity.</p>



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	<p>Electrical safety tips.</p> <p>...be able to:</p> <p>Classify different items, such as flowering and non-flowering plants or electrical and non-electrical objects.</p> <p>Create and use simple keys and branching databases.</p> <p>Construct food chains and discuss the impact of predators.</p> <p>Analyse and interpret patterns in population size which reflect the relationships between predators and prey.</p> <p>Observe the change of state of a material when cooled or heated and use data loggers to record this.</p> <p>Compare and group materials according to their state of matter.</p> <p>Examine the factors which affect evaporation.</p> <p>Investigate whether different liquids evaporate at the same rate.</p> <p>Observe condensation and link this to this to the water cycle.</p> <p>Create models for scientific concepts in different ways.</p> <p>Create a simple circuit involving a range of components.</p> <p>Investigate conductivity of materials and how to make a bulb brighter or dimmer.</p>								
Key Vocabulary					Key assessment of learning questions				
<p>Animals including humans</p> <p>Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore,</p>	<p>Living things and their habitats</p> <p>Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms,</p>	<p>Electricity</p> <p>Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series,</p>	<p>States of Matter</p> <p>Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature,</p>	<p>Sound</p> <p>Volume, Vibration, Wave, Pitch, Tone, Speaker</p>	<p><u>Animals including humans</u></p> <p>Describe the digestive process.</p> <p><u>Living things and their habitats</u></p> <p>Group the animals depending on their classification.</p>				



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Carnivore, Canine, Incisor, Molar	Spiders, Insects, Environment, Habitats	Conductors, Insulators.	Freezing, Heating, boiling	<p><u>Electricity</u> Can you make a complete circuit?</p> <p><u>States of matter</u> Can (insert) be all states of matter?</p> <p><u>Sound</u> How does sounds travel? Explain the process of how sound travels from the source to the ear.</p>
Logical Progression Links to Enhance Long Term Memory (learning)				<p>Linking animals and living things to Nature Walks and art, including Cannock Chase trip.</p> <p>Statistics linked to Maths and Geography, including use of data loggers.</p> <p>Water cycle linked to Geographical knowledge.</p> <p>Electrical safety linked to SMSC and assemblies.</p> <p>Think Tank trip to Birmingham linked to electricity and states of matter.</p> <p>Tactile water cycle posters-Braille</p>
A Scientist in Year 5 will...				<p>...know:</p> <ul style="list-style-type: none"> • Lifecycles of a mammal (including humans) and how this differs to an amphibian and insect. • What complete and incomplete metamorphosis is. • What gestation periods are and how they differ between animals. • Understand what reproduction is in humans and animals. • How plants reproduce. • Names of reproductive parts of a flower. • Plants can grow from either seeds, bulbs or cuttings. • Understand the terminology: permeability, insulators, conductors and solubility. • Know that dissolving, mixing and changes of state are reversible changes. • Give examples of reversible and irreversible changes.



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	<ul style="list-style-type: none"> • Gravity is the force which causes objects to fall to the centre of the Earth. • Understand the effects of air and water resistance on objects. • Levers, pulleys and gears use forces to create movement. • Name the planets in the solar system. • Explain the impacts of asteroids and comets on spherical bodies. • The movement of the Earth and other planets relative to the sun in the solar system and understand that they are spherical bodies. • The movement of the Moon relative to the Earth. • That the Earth's rotation causes day and night. <p>...be able to:</p> <ul style="list-style-type: none"> • Create and explain the different stages of lifecycles of a mammal (including humans). • Plan and carry out investigations and analyse the findings/data. • Dissect reproductive parts of a flower. • Separate different materials using different processes e.g. filtration. • Draw diagrams to illustrate the movement of planets in the solar system. • Classify materials according to their properties.
Key Vocabulary	Key assessment of learning questions
<p>Animals including humans Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty</p> <p>Living things and their habitats:</p>	<p>How does the life cycle of a mammal differ to that of an insect of amphibian? How do plants reproduce? What is the difference between a thermal insulator and a thermal conductor? What is the difference between a reversible and irreversible change? What forces are acting upon...? Which planets are in our solar system?</p>



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<p>Mammal, Reproduction, Insect, Reptile, Amphibian, Bird, Offspring.</p> <p>Properties of Materials Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing</p> <p>Earth and Space: Earth, Sun, Star, Moon, Orbit, Axis, Rotation, Day/Night, Phases of the Moon, Constellation.</p> <p>Forces: Air resistance, Gravity, Friction, Water Resistance, Newton, Gears, Pulleys, Kinetic, Potential</p>	<p>How does night and day occur? How do the planets move in relation to the sun? Describe the orbit of the earth and moon.</p>
<p>Logical Progression Links to Enhance Long Term Memory (learning)</p>	<p>Nature walks Planetarium Guinea pigs observation D&T Langley moving toys workshop</p>
<p>A Scientist in Year 6 will...</p>	<p>...know:</p> <ul style="list-style-type: none"> • What is blood; How the heart works; how nutrients travel through the body; the function of the circulatory system; what makes a healthy body • The Linnaeus classification system; identify helpful and harmful bacteria; the conditions needed for the growth of microorganisms • What a simple circuit is; recognise the symbols for components; develop electrical safety awareness • Understand that we inherit features and characteristics from our parents; living things adapt and evolve to their environment



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	<ul style="list-style-type: none"> • Light travels in straight lines; understand that we can see because of reflected light; know the basic structure of the human eye; understand how shadows change; understand that the shape of an object affects its shadow; know which surfaces reflect the most light <p>...be able to:</p> <ul style="list-style-type: none"> • Name the different parts and functions of the body; recognise the impact of diet, exercise, drugs and lifestyle on the way bodies function • Sort and group using a branching database; design and test classification keys to classify living things and plants • Use voltmeters and data loggers to measure and record; investigate the impact of adding / taking away components in a circuit; be able to create a useful circuit with a purpose • Design a creature that has evolved with advantageous characteristics; explore evidence for evolution using fossils • Create graphs to show difference in shadow size / distance from light source; data loggers to measure which surfaces reflect the most light / measure light 	
<p>Key Vocabulary</p>	<p>Key assessment of learning questions</p>	
<p>Animals including humans Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration</p> <p>Living things and their habitats: Classification, Vertebrates, Invertebrates, Micro-</p>	<p>Working scientifically? Evaluate Investigate Record Independent Variable Fair test Dependent Enquiry Control Measurement</p>	<p>What environment would a camel / polar be suited to and why? Use the word adaptation to explain your answer.</p> <p>How could you find out whether a circuit is complete?</p> <p>How do you make a shadow bigger / smaller?</p> <p>What causes mould to grow?</p> <p>What is the difference between a male and female?</p> <p>What is the difference between veins and arteries?</p>



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organisms, Amphibians, Reptiles, Mammals, Insects Electricity: Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell Light: Refraction, Reflection, Light, Spectrum, Rainbow, Colour Evolution and Inheritance: Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics	Equipment Accuracy / precision Readings / recordings Data Results Diagrams Labels Keys Tables Graphs Predictions Comparative Present Causal Evidence	
Logical Progression Links to Enhance Long Term Memory (learning)		Trip to Arthog Nature walk - inheritance and adaptation STAR workshops - healthy living - drugs and alcohol

End of Key Stage Curriculum Intent Statement

Early Years	Key Stage One	Key Stage Two
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<p>A Scientist by the end of Early Years will...</p> <p>...experience:</p> <ul style="list-style-type: none">• The sights and smells inside and outside classroom.• What animals and people do.• Observations of animals at the farm, insects in the Forest and plants grown in the classroom(broad bean).• Taking care of the flowerbeds.• Collections of sets of items such as pine cones, wooden rings for children to explore how objects can be combined.• Tasting of different food including cooking and react using facial expression.• Characteristics of liquids and solids by involving children in melting chocolate or cooking eggs.• Daily opportunities for sensory exploration through tuff spot activities. <p>...be able to:</p>	<p>A Scientist by the end of Key Stage One will...</p> <p>...know:</p> <ul style="list-style-type: none">• The names and location of parts of the human body, including those related to the senses.• Different features of an animal.• What different animals eat.• Seasonal changes.• Properties of different materials.• The suitability of different materials for different uses.• The importance of exercise, a balanced diet and hygiene for humans.• The basic needs of animals and plants for survival.• That a food chain is a flow of energy.• That how animals can be suited to different habitats. <p>...be able to:</p> <ul style="list-style-type: none">• Ask simple questions and recognising that they can be answered in different ways•Observe closely, using simple equipment•Perform simple tests•Identify and classifying	<p>A Scientist by the end of Key Stage Two will...</p> <p>...know:</p> <ul style="list-style-type: none">• The names and functions of the main part of the Musculoskeletal system.• The names and functions of the main parts of the digestive system.• The names and functions of the main parts of the Circulatory system.• The effects of diet, exercise, drugs and lifestyle on how the body functions.• The names, locations and the functions of the main parts of plants, including those involved in transporting water and nutrients.• The requirements of plants for life and growth.• The name, location and functions of the main parts of plants, including those involved in reproduction.• The reproductive processes and life cycles in animals• The features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or other methods.• The basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved.• How environmental changes may have an impact on living things• How fossils are formed.
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- Explore puddles, trees and surfaces such as grass, shiny surfaces and textures.
- Observe interesting things when they are looking around for example, looking up at the ceiling or peering into a corner.
- Investigate and notice detailed features of the natural world e.g. streamers and bubbles to explore the effects of wind, magnifying glasses, magnets, torches.
- Ask and answer questions such as "How can we...?" or "What would happen if...?".
- Use correct terms so that, e.g. children will enjoy naming a chrysalis if the practitioner uses its correct name.
- Name parts of a growing bean-root, shoot, stem, leaves.
- To talk about changes such as babies growing, melting ice, plants growing, changes in seasons

- Use observations and ideas to suggest answers to questions
- Gather and record data to help in answering questions

- That light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects and the shape of shadows.
- How shadows are formed.
- Rock types and their properties.
- How materials change state at different temperatures including the water cycle. To identify reversible and irreversible changes.
- How sounds are made and heard and the relationship between the pitch of a sound and the features of its source.
- Properties of materials and the use of different everyday materials for different uses, based on their properties.
- What happens when dissolving occurs in everyday situations; and describe how to separate mixtures and solutions into their components.
- The effects of simple forces that involve contact (air and water resistance, friction) and gravity.
- Simple mechanisms, including levers, gears and pulleys, that increase the effect of a force
- The shapes and relative movements of the Sun, Moon, Earth and other planets in the solar system;
- The apparent movement of the sun across the sky in terms of the Earth's rotation and that this results in day and night.

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		<ul style="list-style-type: none">• How to control a series circuit, and describe how the circuit may be affected when changes are made to it.• The symbols which represent simple series circuit diagrams <p>...be able to:</p> <ul style="list-style-type: none">• describe and evaluate their own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources• ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources) <p>Use scientific vocabulary accurately</p> <ul style="list-style-type: none">• use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate• record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
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		<ul style="list-style-type: none">• draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways• raise further questions that could be investigated, based on their data and observations.
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End of Primary School Curriculum Intent Statement/School Ready for Key Stage Three

A Scientist at Newdale will...

...know:

When a child leaves Newdale, they will know a wide range of scientific ideas through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. Pupils will have a secure understanding of the following categories:

- Living things and their habitats
- Seasonal changes
- Animals including humans
- Properties and changes of materials
- Rocks
- Forces
- Light
- Sound
- Electricity



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- Earth and Space
- Evolution and inheritance

Towards the end of their primary education, pupils would have encountered ideas, which are more abstract, and can now begin to recognise how these ideas help them to understand and predict how the world operates. They recognise that scientific ideas change and develop over time. They are able to select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils can draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. Pupils can read, spell and pronounce scientific vocabulary correctly.

...be able to:

- Describe and evaluate their own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources
- Use scientific vocabulary accurately
- Ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources)
- Use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate
- Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways
- Raise further questions that could be investigated, based on their data and observations.

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