Durley CE (Controlled) Primary School

Science Curriculum – Long Term Overview

INTENT

The national curriculum states:

> "A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes."

Through our Science curriculum, we aim to equip children with the knowledge and skills they need to become the next generation of Scientists. We offer a Science curriculum that evokes curiosity, excitement and understanding of the world through the specific disciplines of Biology, Chemistry and Physics. Throughout our Science curriculum, children enquire, hypothesise, observe, test, and report on their findings. They have a wide range of first-hand Science experiences that allow for meaningful exploration, investigation and understanding.

IMPLEMENTATION

Our Science curriculum ensures children develop scientific knowledge alongside the skills of working scientifically. We follow a progressive approach allowing children to continually build on their knowledge, skills and understanding. Every area of learning in Science contains practical tasks and demonstrations that spark children's curiosity, engages their minds and evokes critical thinking. Each learning sequence is carefully planned to ensure the key features of scientific enquiry are taught, including: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing; and researching using secondary sources. Our Science curriculum includes longitudinal studies to allow children to observe and measure changes over time, as well as STEM projects that enable children to see the role of other subjects alongside Science, especially technology and maths.

IMPACT

The impact of our curriculum is that children develop a love of Science, achieve their full potential and marvel at the awe and wonder of how Science is present in their daily lives. Children will recall the rich learning experiences they have been provided with and be able to draw on their scientific knowledge and understanding as they progress into Key Stage 3. Children will be able to think critically, ask questions and carry out enquiries in order to help them answer scientific questions about the world around them. Overall, children will be equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Science Long Term Overview					
Year 1,2 Cycle 1					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Longitudinal study: **Seasonal changes:** weather, temperature, and light – children will measure, describe, observe, and record weather throughout the seasons and identify similarities and differences. Year 1 PoS: • observe changes across the four seasons. • observe and describe weather associated with the seasons and how day length varies.					
Animals including humans NC Year 2	STEM "Pumpkins against Poverty"	**Everyday materials** NC Year 1	**Living things and their habitats** NC Year 2	Super Science "Holiday" Year 1 SoS	**Plants** NC Year 1 and Year 2
• identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **(Y1)** • 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	Children explore the difference that growing pumpkins can make to the lives of people living in flood affected regions in Bangladesh. It includes finding out about Bangladesh and its people and ways to address poverty, investigating the pumpkin lifecycle and seed germination, designing and making seed packets and cooking using pumpkin recipes. **Working scientifically:** • observing closely, using simple equipment	• distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties.	• 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. **Working scientifically:** • using their observations and ideas to suggest answers to questions • identifying and classifying	• 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 including pets • distinguish between an object and the material from which it is made	• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees. • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

types of food, and hygiene. **Working scientifically:** • asking simple questions and recognising that they can be answered in different ways • gathering and recording data to help in answering questions	• using their observations and ideas to suggest answers to questions	**Working scientifically:** • asking simple questions and recognising that they can be answered in different ways • performing simple tests • identifying and classifying		• identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. describe the simple physical properties of a variety of everyday materials. • describe and compare the structure of a fish with humans and some other animals. **Working scientifically:** • identifying and classifying • gathering and recording data to help in answering questions	**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 answering questions

Science Long Term Overview					
Year 1,2 Cycle 2					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Longitudinal Study: **Seasonal changes:** Plants & animal – children explore the habits of animals including migration, hibernation and nocturnality. They observe changes in plants and trees throughout the seasons. Year 1 PoS: • observe changes across the four seasons. • observe and describe weather associated with the seasons and how day length varies.					
Uses of everyday materials NC Year 2	STEM project "Three Billy Goats Gruff"	**Animals including humans** NC Year 1	**Living things and their habitats** NC Year 2	Super Science "Little Masterchefs" Including STEM Year 2 SoS	**Plants** NC Year 1 and Year 2
• identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **Working scientifically:** • asking simple questions and recognising that they	Children act as engineers in order to help the three Billy Goats build a bridge. The bridge needs to be 40cm long and be strong enough to support three soft toys. They should build, test and improve a design and then demonstrate how their design works. **Working scientifically:** • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment	• 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, including pets).	• explore and compare the differences between things that are living, dead, and things that have never been alive. • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. **Working scientifically:**	• find out about and describe the basic needs of humans for survival (water, food and air). • describe the importance for humans of eating the right amounts of different types of food, and hygiene. • observe and describe how seeds and bulbs grow into plants. • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic,	• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • identify and describe the basic structure of a variety of common flowering plants, including trees. • observe and describe how seeds and bulbs grow into mature plants. • find out and describe how plants need water, light and a suitable

can be answered in different ways • performing simple tests • identifying and classifying	• performing simple tests • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions	**Working scientifically:** • asking simple questions and recognising that they can be answered in different ways • gathering and recording data to help in answering questions	• using their observations and ideas to suggest answers to questions • identifying and classifying	glass, brick, rock, paper and cardboard for particular uses. **Including STEM projects** **Working scientifically:** • observing closely, using simple equipment	temperature to grow and stay healthy. **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 answering questions

Science Long Term Overview					
Year 3, 4, 5 Cycle 1					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Longitudinal study: **Let it Shine** - explore the changing length of shadows throughout the year and the number of hours of sunlight a day. Set the study up in September and record and measure over the course of the year. Discuss the changes that take place over the year.					
Earth and Space "Out of this World" NC Year 5	**Animals inc. humans** "Food and Our Bodies" NC Year 3	**Forces** "Let's Get Moving!" NC Year 5	Super Science "Bubbles" Year 4 SoS	STEM project "Solar Challenge"	**Living things & their habitats** "Circle of Life" NC Year 5
▪ describe the movement of the Earth and other planets relative to the sun in the solar system. ▪ describe the movement of the moon relative to the Earth. ▪ describe the sun, Earth and moon as approximately spherical bodies. ▪ use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. **Working scientifically:** • identifying scientific evidence that has been used to support	• identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. • identify that humans and some other animals have skeletons and muscles for support, protection and movement. **Working scientifically:** • asking relevant questions and using different types of scientific enquiries to answer them	• explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • identify the effects of air resistance, water resistance and friction, that act between moving surfaces. • recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect. **Working scientifically:** • planning different types of scientific enquiries to answer questions, including recognising and	• make and record observations • investigate and explain the effect of making changes to bubble mixtures • plan and carry out a fair test • identify similarities, differences or patterns in results **Working scientifically:** • setting up simple practical enquiries, comparative and fair tests • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Investigate the generation of electricity by solar cells and how this can transform the lives of people without access to mains. Link to Practical Action's work in Gwanda, Zimbabwe. **Working scientifically:** • observing closely, using simple equipment • performing simple tests • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions	• describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals **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,

or refute ideas or arguments		controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • 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	• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions		with increasing accuracy and precision • reporting and presenting findings from enquiries, including conclusions

Science Long Term Overview					
Year 3, 4, 5 Cycle 2					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Longitudinal Study: **We are meteorologists -** (Year4 computing unit). In September, set up the school weather station, create a weather spreadsheet and make predictions about seasons. Observe and record data periodically throughout the year. Take photographs of different weather during course of year.					
Properties & changes of materials "Material World" NC Year 5	**Sounds** "What's that sound?" NC Year 4	STEM project "Beat the Flood"	**Electricity** "Power it Up!" NC Year 4	**Forces and Magnets** "Opposites Attract" NC Year 3	**Plants** "How does your garden grow?" NC Year 3
• 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. • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering,	• identify how sounds are made, associating some of them with something vibrating. • recognise that vibrations from sounds travel through a medium to the ear. • find patterns between the pitch of a sound and features of the object that produced it. • find patterns between the volume of a sound and the strength of the vibrations that produced it. • recognise that sounds get fainter as the distance from	Children will design and build a model of a flood-proof house. Activities to help them with their design include testing materials (for strength and absorbency) and structures. Set on a fictitious island coping with the devastating effects of flooding caused by climate change. **Working scientifically:** • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using	• identify common appliances that run on electricity. • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.	• compare how things move on different surfaces. • notice that some forces need contact between 2 objects, but magnetic forces can act at a distance. • observe how magnets attract or repel each other and attract some materials and not others. • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials. • describe magnets as having 2 poles.	• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • investigate the way in which water is transported within plants. • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed

sieving and evaporating. • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • demonstrate that dissolving, mixing and changes of state are reversible changes. • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. **Working scientifically:** • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using	the sound source increases. **Working scientifically:** • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables •	standard units, using a range of equipment • using straightforward scientific evidence to answer questions or to support their findings.	• recognise some common conductors and insulators, and associate metals with being good conductors. **Working scientifically:** • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	• predict whether 2 magnets will attract or repel each other, depending on which poles are facing. **Working scientifically:** • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations • 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 straightforward scientific evidence to answer questions or to support their findings	formation and seed dispersal. **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 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 • reporting on findings from enquiries, including oral and written explanations, displays or presentations of

a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results					results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Science Long Term Overview					
Year 3, 4, 5 Cycle 3					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Longitudinal study: **Living things -** In September, choose 3 different habitats: pond, leaf litter area, bushes, soil, flower garden. Study the living things in the habitat and take photos. Predict how seasonal changes will affect the habitat and therefore the animals living there. Observe and record changes throughout the year.					
Rocks **"**Earth Rocks!" NC Year 3	**Animals, inc. humans** "Teeth and Eating" NC Year 4	**States of matter** "What a State!" NC Year 4	**Light** "Mirror Mirror!" NC Year 3	STEM project "Wind power"	**Living things & their habitats** **"**Living Things" NC Year 4
• compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • describe in simple terms how fossils are formed when things that have lived are trapped within rock. • recognise that soils are made from rocks and organic matter. **Working scientifically:** • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate,	• describe the simple functions of the basic parts of the digestive system in humans. • identify the different types of teeth in humans and their simple functions. • construct and interpret a variety of food chains, identifying producers, predators and prey. **Working scientifically:** • setting up simple practical enquiries, comparative and fair tests • recording findings using simple scientific language, drawings, labelled	• compare and group materials together, according to whether they are solids, liquids or gases. • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. **Working scientifically:**	• recognise that they need light in order to see things and that dark is the absence of light. • notice that light is reflected from surfaces. • recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • recognise that shadows are formed when the light from a light source is blocked by an opaque object. • find patterns in the way that the size of shadows change. **Working scientifically:** • setting up simple practical enquiries,	One of the most important questions facing us all is how we will use the planet's energy resources over the coming decades. Many people believe that wind power can make a vital contribution. Making informed choices requires an understanding of what a wind turbine is and what it does. The children will learn the science behind wind power, involving concepts such as energy and power, the conservation of energy and energy efficiency. **Working scientifically:** • identifying scientific evidence that has been used to	• recognise that living things can be grouped in a variety of ways. • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • recognise that environments can change and that this can sometimes pose dangers to living things. **Working scientifically:** • making systematic and careful observations • gathering, recording, classifying and presenting data in a

taking accurate measurements using standard units, and a range of equipment • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.	diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using straightforward scientific evidence to answer questions or to support their findings.	• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • identifying differences, similarities or changes related to simple scientific ideas and processes	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	support or refute ideas or arguments	variety of ways to help in answering questions • identifying differences, similarities or changes related to simple scientific ideas and processes

Science Long Term Overview					
Year 6					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Longitudinal Study: **Changing and growing** - during the course of the year, the children will make observation of themselves and take measurements such as handspans, feet length, height, (weight if choose to), head circumference, arm length etc. At the end of the study, they may graph some of their results, draw conclusions and make comparisons and predictions. They will link their study to how the human body changes, from birth to childhood to adulthood.					
Animals, inc. humans Staying Alive! NC Year 6	**Light** Let it Shine! NC Year 6	**Evolution & inheritance** We're Evolving! NC Year 6	**Living things & their habitats** Classifying Critters NC Year 6	**Electricity** Electrifying! NC Year 6	**Animals inc. humans** Growing Pains NC Year 5
• identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • describe the ways in which nutrients and water are transported within animals, including humans. **Working scientifically:** • identifying scientific evidence that has been used to support or refute ideas or arguments	• recognise that light appears to travel in straight lines. • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. **Working scientifically:**	• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. **Working scientifically:** • identifying scientific evidence that has been used to support	• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. • give reasons for classifying plants and animals based on specific characteristics. **Working scientifically:** • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • use recognised symbols when representing a simple circuit in a diagram. **Working scientifically:** • taking measurements, using a range of scientific equipment, with increasing accuracy and	• describe the changes as humans develop to old age. **Working scientifically:** • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data using tables, scatter graphs, bar and line graphs • reporting and presenting findings from enquiries

	• 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 • 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	or refute ideas or arguments	• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • identifying scientific evidence that has been used to support or refute ideas or arguments	precision, taking repeat readings when appropriate 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	