SCIENCE AT NEWTON

INTENT: Our Science curriculum is deliberately designed to provide the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. As Science has been the catalyst for change on both an individual and a global level, it is essential that children encounter the knowledge, methods, processes and uses of science through a logically sequenced and progressive curriculum. This curriculum is based on the building up of a body of key foundational knowledge and concepts, where children are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. Children are given a broad range of learning experiences that helps them to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

IMPLEMENT: At Newton, Science is taught weekly through sequenced learning units from Cornerstones. Each unit is based on scientific knowledge and concepts that are progressively built up to ensure a secure base for future learning. Children are exposed to and encouraged to use technical terminology accurately and precisely – and this is carefully mapped out across the key stages. Fundamental to our Scientific approach is that children are able to investigate, solve problems and use their scientific skills to research and discover answers to questions set for them (younger pupils) as well as those they have created for themselves (older pupils).

LEARNING OVERVIEW

2023-24 (Cycle A)
2024-25 (Cycle B)
2025-26 (Cycle C Oak Class/Cycle A Juniper and Willow Classes)

EYFS

Children in EYFS will undertake learning and activities related to the **content** of the Year 1 Science curriculum (see unit plans for detail) but being consistent with EYFS pedagogy and underpinned by the focuses from EYFS Framework/Development Matters.

Reception Knowledge and Understanding of the World

- Explore the natural world around them.
- Describe what they see, hear and feel whilst outside
- Understand the effect of changing seasons on the natural world around them

ELG – 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.		
	AUTUMN 1	**AUTUMN 2**	**SPRING 1**	**SPRING 2**	**SUMMER 1**	**SUMMER 2**
JUNIPER Year cycle (A/B repeats)	Everyday Materials	Human Senses	Seasonal Changes	Uses of Materials	Plant Parts	Animal Parts
WILLOW Cycle A	Human Survival	Habitats	Forces and Magnets		Animal Nutrition and the skeletal system	
WILLOW Cycle B	Animal Survival		Plant Survival		Plant nutrition and reproduction	Lights and Shadows
OAK Cycle A	Circulatory System		Electrical Circuits and Components		Light Theory and Reproduction	Evolution and Inheritance
Oak Cycle B	Forces and Mechanisms	Earth and Space	Properties and Changes of Materials		Human Reproduction and Ageing	
Oak Cycle C	Food and the Digestive System	Sound	States of Matter	Grouping and Classifying	Electrical circuits and Conductors	
IMPACT (End Goals)						
Juniper Class (EYFS/Year 1) Working Scientifically – children should be able to:			**Willow Class (Years 2 and 3) Working Scientifically – children should be able to:**		**Oak Class (Years 4, 5, 6) Working Scientifically – children should be able to:**	

- ask simple questions and recognise that they can be answered in different ways
- observe closely, using simple equipment
- perform simple tests
- identify and classify
- use their observations and ideas to suggest answers to questions
- gather and record data to help in answering questions

Plants

Pupils should be taught to:

- 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

Animals, including humans

Pupils should be able to:

- 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)

- ask relevant questions and use different types of scientific enquiries to answer them
- set up simple practical enquiries, comparative and fair tests
- make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers
- gather, record, classify and present data in a variety of ways to help in answering questions
- record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- use straightforward scientific evidence to answer questions or to support their findings

YEAR 2

Living things and their habitats

Pupils should be able to:

- explore and compare the differences between things that are living, dead, and things that have never been alive

- plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- use test results to make predictions to set up further comparative and fair tests
- report and present 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
- identify scientific evidence that has been used to support or refute ideas or arguments

YEAR 4

Living things and their habitats

Pupils should be able 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

- identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

Everyday materials

Pupils should be able to:

- 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

Uses of everyday materials

Pupils should be able to:

- 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

Seasonal changes

Pupils should be able to:

- observe changes across the 4 seasons

- 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 microhabitats
- 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

Pupils should be able to:

- 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

Animals, including humans

Pupils should be able to:

- 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

- recognise that environments can change and that this can sometimes pose dangers to living things

Animals, including humans

Pupils should be able to:

- 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

States of matter

Pupils should be able to:

- 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

S**ound**

Pupils should be able to:

- identify how sounds are made, associating some of them with something vibrating

• observe and describe weather associated with the seasons and how day length varies	**Uses of everyday materials** Pupils should be taught to: • 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 **YEAR 3** **Plants** Pupils should be able to: • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal **Animals, including humans** Pupils should be able to: • identify that animals, including humans, need the right types and amount of nutrition, and	• 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 the sound source increases **Electricity** Pupils should be able to: • 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 • recognise some common conductors and insulators, and associate metals with being good conductors **YEAR 5**

	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 **Light** Pupils should be able to: • 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 **Forces and magnets** Pupils should be able to: • 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	**Living things and their habitats** Pupils should be able to: • 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 **Animals, including humans** Pupils should be able to: • describe the changes as humans develop to old age **Properties and changes of materials** Pupils should be able 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 • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

	• 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 • predict whether 2 magnets will attract or repel each other, depending on which poles are facing	• 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 **Earth and space** Pupils should be able to: • 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 **Forces** Pupils should be able to: • 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

		YEAR 6 **Living things and their habitats** Pupils should be able to: • 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 **Animals including humans** Pupils should be able to: • 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 **Evolution and inheritance** Pupils should be able 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

		• 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 **Light** Pupils should be able to: • 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 **Electricity** Pupils should be able to: • 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

ASSESSMENT

Science learning can be recorded in Topic books or individual Learning Journeys (Juniper Class). This learning may include written, pictorial or diagrammatic responses. In the younger years (but not exclusively) there may be a class learning journey where adults capture learning as scribed oral contributions from pupils, or photographs or other observations/commentary.

Teachers assess learning in a number of ways: by making observations of the children working during lessons, listening to their responses and ideas, looking at work in books as well as outcomes of weekly quizzes and end of unit tests. All these assessment tools help teachers to reach a judgement as to how well the unit content has been learnt ie. do children know, remember and can do the things we have been teaching them? Each unit of learning in Science specifies what constitutes the "expected" learning for most pupils and teachers will decide whether a child has met that criteria, either in part or as a whole or indeed whether they have gone beyond it. While it is crucial that the teacher then acts on the outcomes of this assessment so that it informs future learning, it also provides a snapshot summary identifying who is on track, who is not there yet and who is out in front.

Statutory Assessment: Pupils in Key Stage Two (Year 6) are assessed against the statutory TA Frameworks – these are in the form of "pupil can" statements to help the teacher reach a secure fit in terms of their judgements. There are exemplification materials available for teachers to support them reaching their judgements.