Boyne Hill Infant and Nursery School – Knowledge & Skills Progression Overview

Science

Purpose: 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.

The National Curriculum Programme of Study for Science describes a sequence of knowledge and concepts, processes and methods. This sequence of knowledge and concepts is arranged as progressive blocks of key ideas in biology, chemistry and physics, alongside a progression in the skills of working scientifically. The conceptual ideas in Biology, Chemistry and Physics build on each other and children need to develop a strong understanding of each set of ideas in order for the next set to make sense and for them to make progress. The Programme of Study is set out year by year for Key stage 1 but each science topic is not covered in every year. However, children's science learning does not begin with the National Curriculum Programme of Study for Year One and will start in the foundation stages of the school. Between the ages of three and five years, children show marked development in their understanding of scientific concepts and their ability to test them. This is recognised in the Early Years Foundation Stage, where 'Understanding the world' is specified as a learning goal, and playing and exploring, active learning and creating and thinking critically represent the ways in which young children learn.

The Science Progression identifies the key ideas within Biology, Chemistry and Physics in the National Curriculum and are documented to show how they relate to each other and how one idea builds on another. The National Curriculum statements have been edited into key ideas statements. The source of each key idea is identified by the year group and the Programme of Study topic heading. Some additional statements have been added to make important links between ideas.

Working scientifically is a key factor in the science curriculum and this is considered in each key stage throughout the school. The progression of the skills required to work scientifically are built upon throughout the year groups.

Intent: To develop in our pupils, a lifelong curiosity and interest in the sciences, having the opportunity, wherever possible, to learn through investigations, leading to them being equipped in life to ask and answer scientific questions about the world around them. As pupils progress through the school, they build on their skills in working scientifically, as well as on their scientific knowledge. Pupils should also read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

Early Years Foundation Stage Links the EYFS Framework	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 world around them. In addition, listening to a broad selection of stories and non-fiction will foster their understanding of our ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains.	
3-4 Years (FS1 Nursery)	**PSED**	Children will learn about and be guided to make healthy choices about food, drink, activity and tooth brushing.
	CL	Understand 'why' questions.

Development Matters 2021	**UW**	Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary. Explore how things work. Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice.
4-5 Years (FS2 Reception) Development Matters 2021	**PSED**	Know and talk about the different factors that support their overall health and wellbeing: -regular physical activity -healthy eating -tooth brushing -sensible amounts of 'screen time' -having a good sleep routine -being a safe pedestrian
	CL	Learn new vocabulary. Ask questions to find out more and to check what has been said to them. Articulate their ideas and thoughts in well-formed sentences. Describe events in some detail. Use talk to help work out problems and organise thinking and activities and to explain how things work and why they might happen. Use new vocabulary in different contexts.
	UW	Explore the natural world around them. Describe what they see, hear and feel while they are outside. Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them.
Early Learning Goal (ELG)	**PSED**	Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
	UW	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.
	CL	Make comments about what they have heard and ask questions to clarify their understanding.

Year 1 *Statutory requirements*	**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 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, including pets). 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** 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. **Seasonal change** Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.
Year 2 *Statutory requirements*	**Living things and their habitats** 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. 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 a suitable temperature to grow and stay healthy. **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. **Use 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 stretching.

BIOLOGY – Plants: Structure and Function, Growth and needs			
FS1	**FS2**	**Year 1**	**Year 2**
To know that seeds, when planted and cared for, will grow into plants.	That by exploring the natural world around us, we can learn through making observations, talking about and drawing pictures of plants, also drawing on past experiences of understanding how a plant grows.	To know a variety of common plants, and how they differ. **structure & function**	To know that seeds and bulbs grow into seedlings by producing roots and shoots. **growth & needs**
To know that plants have a life cycle and what the key features are.		To know that deciduous trees lose their leaves seasonally, but evergreen trees do not. **structure & function**	To know that seedlings grow into mature plants by developing parts, that may include stems/trunks, leaves, flowers and fruits. **growth & needs**
To take notice of everything around us, including places and all the things within them such as trees in the natural environment, talking about what we see.		To know the basic structure (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants, including flowering plants and trees. **structure & function**	To know that seeds need water to germinate. **growth & needs**
Through talk and practice, that we all need to respect and care for the natural environment in order for it to survive.		To begin to understand how plants grow and change over time. **growth & needs**	To know that plants need water, light and a suitable temperature for growth and health. **growth & needs**

BIOLOGY – Animals, including humans: Growth, Structure and function, Health and nutrition			
FS1	**FS2**	**Year 1**	**Year 2**
To know that we can manage our own basic hygiene and personal needs, including dressing and going to the toilet.	To know that regular physical activity, healthy eating, tooth brushing, having sensible amounts of 'screen time', having a good sleep routine and being a safe pedestrian, supports our overall health and wellbeing.	To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals). **animal growth**	To understand how living things change, and that animals have offspring that grow into adults. **animal growth**
Through talk and practice, what a healthy food choice is and why this is important.	That there are some similarities and differences between the natural world around us and contrasting environments, drawing on our experiences and what has been read in class.	To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell). **structure & function**	To know which offspring comes from which parent animal. **animal growth**

To know that animals have a life cycle and what the key features are.	That we can explore the natural world around us and make observations and draw pictures of the animals we find and see.	To know key parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth). **structure & function**	To know the stages in some animal life cycles. **animal growth**
Through talk and practice, that we all need to respect and care for all living things in order for them to survive.	That we can recognise some environments that are different from the one in which we live.	To know the five main senses: sight, smell, hearing, taste and touch. **structure & function**	To know that animals, including humans, need water, food and air to survive. **health & nutrition**
To be aware of our own immediate environment and the things nearby. This awareness is extended by visiting places and finding out about different elements of environments in books, on TV and through using other technology.		To know that eyes are used for sight, the nose is used for smell, ears are used for hearing, the tongue and mouth are used for taste and the skin is used for touch. **structure & function**	To understand the importance of exercise, a balanced diet and hygiene for humans. **health & nutrition**
		To know that a carnivore is an animal that eats other animals and to give some examples. **health & nutrition**	
		To know that a herbivore is an animal that eats only plants and to give some examples. **health & nutrition**	
		To know that an omnivore is an animal that eats both animals and plants, and to give some examples. **health & nutrition**	

BIOLOGY – Living things and their habitats (Microhabitats): Characteristics, Variation and inheritance, Habitats and interdependence			
FS1	**FS2**	**Year 1**	**Year 2**
			To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition. **characteristics**
			To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes. **characteristics**
			To know a variety of plants and animals and describe some differences. **variation & inheritance**

			To name a variety of habitats, including woodland, ocean, rainforest and seashore. **habitats & interdependence**
			To know that a habitat is the environment where an animal or plant lives/ grows, because it provides what they need to survive. **habitats & interdependence**
			To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter). **habitats & interdependence**
			To know that living things depend upon each other (e.g. for food, shelter). **habitats & interdependence**
			To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals. **habitats & interdependence**
CHEMISTRY – Materials: Identifying and naming, Properties and uses, Change			
FS1	**FS2**	**Year 1**	**Year 2**
To know that we can use our sense of touch through our hands and feet to explore different natural materials.	To know that we can describe what we see, hear and feel whilst outside.	To know that objects are items or things. **identifying & naming**	To know why objects are made from particular materials and to give examples of their suitability. **properties & uses**
To know that we can explore collections of different materials to find those with similar and/or different properties.		To know that a material is what an object is made from. **identifying & naming**	To know that one material can be used for a range of purposes (and to give examples). **properties & uses**
To be able to talk about the differences between materials and changes that we notice.		To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. **identifying & naming**	To know that different materials can be used for the same purpose (and to give examples). **properties & uses**
		To know that property refers to how a material can be described. **properties & uses**	To know why certain materials are unsuitable for particular objects. **properties & uses**

		To describe the physical properties of a variety of everyday materials. **properties & uses**	To know that a force must be applied to change the shape of a solid object. **change**
		To understand that materials can be grouped based on their physical properties. **properties & uses**	To know that solid objects can be squashed, bent, twisted or stretched. **change**
			To know that different solid objects may take a different amount of force to change shape. **change**

PHYSICS – Forces, Earth and Space: Key facts, Forces in motion			
FS1	**FS2**	**Year 1**	**Year 2**
To know that different seasons mean different types of weather and acknowledge this by wearing appropriate clothes for the weather/season and be able to say why.	To know that the natural world around us changes at different times and how we can react to those changes, including the seasons.	To know the name and order of the four seasons; spring, summer, autumn and winter. **key facts**	
To know that we can explore and talk about different forces we can feel.		To know that it is unsafe to look directly at the Sun. **key facts**	
		To know the weather associated with the four seasons and how it changes (in the UK). **forces in motion**	
		To understand that day length varies across the four seasons, with fewer daylight hours in the winter and more in the summer. **forces in motion**	

WORKING SCIENTIFICALLY: Posing questions, Planning, Predicting
Year 1 and Year 2
Exploring the world around them and raising their own simple questions. **posing questions**
Recognising there are different types of enquiry (ways to answer a question). **posing questions**
Responding to suggestions of how to answer their questions. **posing questions**
Beginning to recognise whether a test is fair. **planning**
With support, deciding if suggested observations are suitable. **planning**

Ordering a simple method. **planning**
Suggesting what might happen, often justifying with personal experience. **predicting**
WORKING SCIENTIFICALLY: Observing, Measuring, Researching, Recording, Grouping and classifying
Year 1 and Year 2
Using their senses to describe, in simple terms, what they notice or what has changed. **observing**
Using non-standard units to measure and compare. **measuring**
Beginning to use standard units to measure and compare. **measuring**
Beginning to use simple measuring equipment to make approximate measurements. **measuring**
Reading simple numbered scales. **measuring**
Gathering specific information from one simplified, specified source. **researching**
Drawing and labelling simple diagrams. **recording**
Using a prepared table to record results including numbers, simple observations and tally frequency. **recording**
Grouping based on visible characteristics. **grouping & classifying**
Organising questions to create a simple classification key. **grouping & classifying**
WORKING SCIENTIFICALLY: Graphing, Analysing and drawing conclusions, Evaluating
Year 1 and Year 2
Representing data using pictograms and block charts. **graphing**
Using their results to answer simple questions. **analysing & drawing conclusions**
Beginning to recognise when results or observations do not match their predictions. **analysing & drawing conclusions**
Beginning to recognise whether a test is fair or not. **evaluating**