



# Success in Science



## Intent – What do we want to achieve?

At Hardy Mill we want our children to be the best scientists that they can be, curious about the world around them and inspired by the impact of Science in their lives. Key knowledge is taught alongside practical experiences where appropriate and children develop their working scientifically skills as they progress through school from Early Years to Upper Key Stage 2, following the 5 lines of enquiry. Children are encouraged to become independent learners where possible and take pride in their achievements. When working co-operatively in groups children will respect the opinions of others, have the courage to ask questions and suggest ideas. Resilience is fostered through practical investigations. Children are encouraged to see the links between Science and other areas of the curriculum.

When they leave Hardy Mill, all children should have the correct basic knowledge and key skills to access the KS3 Science curriculum at secondary school and be inspired to consider careers in Science based subjects. Staff will have the correct science knowledge and skills to deliver inspiring science lessons.

## Implementation – How do we organise learning?

In Early Years, opportunities for science based activities are identified from the curriculum and may be taught as a key focus, enhanced by practical learning through play opportunities.

The National Curriculum Science objectives are organised into a progressive two year cycle for KS1, LKS2 and UKS2 to accommodate the one and a half class intake with one and a half hours per week of teaching in KS1 and two hours per week in KS2. Activities are adapted to support or challenge children based on both their scientific understanding and ability to access the curriculum through reading or writing. The science curriculum is made accessible to children with SEN by extra adult support, simplification of recording and having extra access to physical resources if needed. The curriculum is enhanced by the school environment, individual visitors, workshops from science based companies and school trips within the local area.

Staff use the PLAN curriculum resources, which cover key vocabulary, key knowledge, suggested learning activities, misconceptions and progression to plan suitable activities. The Phizzi Science resources are used to plan some practical activities that develop key knowledge and working scientifically skills. Chris Quigley resources are also used to provide basic, advancing and deepening knowledge activities. At the start of each new unit the children have a cover sheet containing the key learning statements and key vocabulary. They also have a Knowledge Organiser adapted from the ECM resources. Most work is recorded in Science books but each class also has a 'Big Book' to capture discussions and evidence of practical activities based on the 5 lines of enquiry. A display board in each class is used as a learning wall to reinforce the acquisition of knowledge. At the end of each unit children complete a standardised individual assessment (Headstart) to check knowledge and understanding in addition to application of working scientifically skills to inform teacher assessment. In KS2, LBQ activities are used to support the children in their understanding of vocabulary and retention of knowledge for each unit. At the start of each lesson children are given the opportunity to correct or improve their work following discussion by the teacher of any misconceptions.

Each unit will contain some lessons that develop working scientifically skills. As they progress through school, children are given opportunities to plan and carry out their own investigations with greater independence. The school have signed up to a 4 year programme of staff development and free resources to develop primary physics using the Phizzi Science Resources and delivered by the Ogden Trust.

# National Curriculum - Science

## Purpose of study

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.

## Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

EYFS	KS1	LKS2	UKS2
------	-----	------	------

### DISCIPLINARY

#### Working scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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

### DISCIPLINARY

#### Working scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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
- recording findings using simple

### DISCIPLINARY

#### Working scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions

<p><b>Understanding the World</b></p> <p><b>ELG: The Natural World</b></p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>- Explore the natural world around them, making observations and drawing pictures of animals and plants;</li> <li>- 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;</li> <li>- Understand some important processes and changes in the natural</li> </ul>	<p><b><u>SUBSTANTIVE - BIOLOGY</u></b></p> <p><b>Plants (Y1)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</li> <li>• identify and describe the basic structure of a variety of common flowering plants, including trees</li> </ul> <p><b>Plants (Y2)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• observe and describe how seeds and bulbs grow into mature plants</li> <li>• find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</li> </ul> <p><b>Living things and their habitats (Y2)</b> Pupils should be taught to: explore and compare the differences</p>	<p>scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <ul style="list-style-type: none"> <li>• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>• using straightforward scientific evidence to answer questions or to support their findings.</li> </ul> <p><b><u>SUBSTANTIVE - BIOLOGY</u></b></p> <p><b>Plants (Y3)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li> <li>• 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</li> <li>• investigate the way in which water is transported within plants</li> <li>• explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</li> </ul> <p><b>Living things and their habitats (Y4)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• recognise that living things can be</li> </ul>	<p>to set up further comparative and fair tests</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul> <p><b><u>SUBSTANTIVE - BIOLOGY</u></b></p> <p><b>Living things and their habitats (Y5)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• describe the differences in the life cycles of a mammal, an amphibian,</li> </ul>
--	---	---	--

<p>world around them, including the seasons and changing states of matter.</p>	<p>between things that are living, dead, and things that have never been alive</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• identify and name a variety of plants and animals in their habitats, including microhabitats</li> <li>• 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</li> </ul> <p><b>Animals, including humans (Y1)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</li> <li>• identify and name a variety of common animals that are carnivores, herbivores and omnivores</li> <li>• describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</li> </ul>	<p>grouped in a variety of ways</p> <ul style="list-style-type: none"> <li>• explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</li> <li>• recognise that environments can change and that this can sometimes pose dangers to living things</li> </ul> <p><b>Animals, including humans (Y3)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• identify that humans and some other animals have skeletons and muscles for support, protection and movement</li> </ul> <p><b>Animals, including humans (Y4)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• describe the simple functions of the basic parts of the digestive system in humans</li> <li>• identify the different types of teeth in</li> </ul>	<p>an insect and a bird</p> <ul style="list-style-type: none"> <li>• describe the life process of reproduction in some plants and animals</li> <li>• Animals, including humans</li> <li>• Pupils should be taught to:</li> <li>• describe the changes as humans develop to old age</li> </ul> <p><b>Living things and their habitats (Y6)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• give reasons for classifying plants and animals based on specific characteristics</li> </ul> <p><b>Animals including humans (Y6)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</li> <li>• recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</li> <li>• describe the ways in which nutrients and water are transported within animals, including humans</li> </ul> <p><b>Evolution and inheritance (Y6)</b> Pupils should be taught to:</p>
--	---	---	---

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

### **Animals, including humans (Y2)**

Pupils should be taught 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

### **SUBSTANTIVE - CHEMISTRY**

#### **Everyday materials (Y1)**

Pupils should be taught 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 (Y2)**

Pupils should be taught to:

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper

humans and their simple functions

- construct and interpret a variety of food chains, identifying producers, predators and prey

### **SUBSTANTIVE - CHEMISTRY**

#### **States of matter (Y4)**

Pupils should be taught 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

- 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

### **SUBSTANTIVE - CHEMISTRY**

#### **Properties and changes of materials (Y5)**

Pupils should be taught 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

- 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

**SUBSTANTIVE - PHYSICS**

Test materials to see if light goes through them.

Test materials to see if they are magnetic.

**Rocks (Y3)**

Pupils should be taught to:

- 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

**SUBSTANTIVE - PHYSICS**

**Light (Y3)**

Pupils should be taught 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 (Y3)**

- compare how things move on different surfaces
- notice that some forces need contact

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

**SUBSTANTIVE - PHYSICS**

**Light (Y6)**

Pupils should be taught 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

**Forces (Y5)**

Pupils should be taught to:

- explain that unsupported objects fall



	<p>Test materials to see if electricity flows through them.</p>	<p>between 2 objects, but magnetic forces can act at a distance</p> <ul style="list-style-type: none"> <li>• observe how magnets attract or repel each other and attract some materials and not others</li> <li>• 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</li> <li>• describe magnets as having 2 poles</li> <li>• predict whether 2 magnets will attract or repel each other, depending on which poles are facing</li> </ul> <p><b>Electricity (Y4)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• identify common appliances that run on electricity</li> <li>• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</li> <li>• 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</li> <li>• recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</li> <li>• recognise some common conductors and insulators, and associate metals with being good conductors</li> </ul> <p><b>Sound (Y4)</b> Pupils should be taught to: identify how sounds are made, associating some of them with something vibrating</p>	<p>towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <ul style="list-style-type: none"> <li>• identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>• recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</li> </ul> <p><b>Electricity (Y6)</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li> <li>• 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</li> <li>• use recognised symbols when representing a simple circuit in a diagram</li> </ul>
--	---	---	--

	<p><b>Seasonal changes</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• observe changes across the 4 seasons</li> <li>• observe and describe weather associated with the seasons and how day length varies</li> </ul>	<ul style="list-style-type: none"> <li>• recognise that vibrations from sounds travel through a medium to the ear</li> <li>• find patterns between the pitch of a sound and features of the object that produced it</li> <li>• find patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>• recognise that sounds get fainter as the distance from the sound source increases</li> </ul>	<p><b>Earth and space</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• describe the movement of the Earth and other planets relative to the sun in the solar system</li> <li>• describe the movement of the moon relative to the Earth</li> <li>• describe the sun, Earth and moon as approximately spherical bodies</li> <li>• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</li> </ul>
--	---	--	--



# Hardy Mill Long Term Plan – Science

		Autumn	Spring 1	Spring 2	Summer 1	Summer 2	
<b>EYFS (R)</b>		<b>All about me/ People who help us</b> All About Me People Who Help Us	<b>Into the woods/ Celebrate good times</b> Autumn	<b>Our world and beyond</b> Winter Our Planet/Space	<b>Food glorious food</b> Healthy Eating What our bodies need Where does food come from?	<b>Can we explore it?</b> Spring Life Cycles Growing Recycling	<b>In and around the Sea Summer</b> Under the Sea Hot and Cold Places
	<b>KS1</b>	<b>Cycle A</b>	Humans Y1 (Senses)	Seasonal Changes Y1	Animals Y1 (Identify and name) Seasonal Changes	Living Things and Their Habitats Y2 Seasonal Changes	
	<b>Cycle B</b>	Everyday Materials Y1	Uses of Materials Y2	Plants Y1 (Identify and name)	Plants Y2 (Observe growth)	Animals Including Humans Y2 (Food, hygiene, offspring)	
<b>LKS2</b>	<b>Cycle A</b>	Rocks Y3	Forces and Magnets Y3	Animals Including Humans Y4 (Digestion, teeth, food chains) (Introduce or review food groups)	Plants Y3	Light Y3	
	<b>Cycle B</b>	Animals Including Humans Y3 (Nutrition and Skeleton) (Introduce or review food groups)	Sound Y4	Electricity Y4	Living Things and Their Habitats Y4	States of Matter Y4	
<b>UKS2</b>	<b>Cycle A</b>	Earth and Space Y5	Electricity Y6	Forces Y5	Living Things and their Habitats Y5 and Y6 (Lifecycles and classification) (Introduce or review Changes in humans linked with PSHE)		
	<b>Cycle B</b>	Animals Including Humans Y6 (Circulation, diet, lifestyle)	Light Y6	Properties and Changes of Materials Y5	Evolution and Inheritance Y6 (Introduce or review Changes in humans linked with PSHE)		

## Impact

At Hardy Mill teachers have a number of ways to measure the impact of learning on the children. During a lesson they will use Assessment for Learning techniques such as 'thumbs up, tell me, show me, tell your partner' to check knowledge or understanding. Work in books is marked prior to the next lesson and children complete a Fix It or challenge to correct misunderstandings or apply their knowledge in real life contexts. During a unit of work children will have ways to consolidate the retention of knowledge through discussion of the Knowledge Organiser with a partner, quizzes and online tasks such as LBQ. At the end of a unit of work the children complete a written task to assess the knowledge and some of the working scientifically skills (standardised Headstart assessments). These results are stored on a tracker to assist Year 2 and Year 6 teachers with end of Key Stage Assessment. During a unit of work most of the children complete at least one 'Deeper Thinking Question' to assess their ability to apply their knowledge at a deeper level. Working scientifically skills are assessed through watching their practical work, recording children's comments in the class Big Book and their ability to complete tables, draw graphs and analyse data in their books. Some units of work will include a research opportunity to investigate changes over time.

The subject lead checks the impact of teaching and learning through planning and book scrutinies, pupil interviews, learning walks and cross referencing of the data. Professional development is delivered by the science lead through staff meetings each year. Most staff have also completed practical training using the Phizzi Science resources, delivered by Ogden Trust.

## How do we know our children have made progress? What are their end points?

End of EYFS	See Early learning Goals
End of KS1	See National Curriculum Year 1 and Year 2
End of LKS2	See National Curriculum Year 3 and Year 4
End of UKS2	See National Curriculum Year 5 and Year 6

## Progression of knowledge in Science at Hardy Mill

	EYFS	KS1		LKS2		UKS2	
		Y1	Y2	Y3	Y4	Y5	Y6
<b>Plants</b>	<p>Plant seeds and care for growing plants.</p> <p>Understand the key features of the life cycle of a plant and an animal.</p> <p>Begin to understand the need to respect and care for the natural environment and all living things.</p> <p>Explore the natural world around them.</p> <p>Understand the effect of changing seasons on the natural world around them.</p> <p>Recognise some environments that are different to the one in which they live. <i>Know that plants provide us with food</i></p>	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p> <p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p> <p>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.</p> <p>Investigate the way in which water is transported within plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>				
<b>Living things and their habitat</b>	<p>Understand the key features of the life cycle of a plant and an animal.</p> <p>Begin to understand the need to respect and care for the natural environment and all living things</p> <p>Explore the natural</p>	<p>Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> <p>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,</p>	<p>Recognise that living things can be grouped in a variety of ways.</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p>	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p> <p>Describe the life process of reproduction in some plants and animals.</p> <p>Describe how living things are classified into broad groups according to common observable</p>			

	<p>world around them. Describe what they see, hear and feel whilst 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. Ask questions about the natural environment <i>Name minibeasts and their habitats.</i></p>	<p>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.</p>		<p>characteristics and based on similarities and differences, including microorganisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.</p>
<p><b>Animals including humans</b></p>	<p>Use all their senses in hands-on exploration of natural materials.  Describe what they see, hear and feel whilst outside.  Know and talk about the different factors that support their overall health and wellbeing.  Make healthy choices about food, drink, activity and toothbrushing.  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.</p>	<p>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. 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</p>	<p>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. 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.</p>	<p>Describe the changes as humans develop to old age. 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.</p>

	<i>Know that animals provide us with food</i>	of exercise, eating the right amounts of different types of food, and hygiene		
<b>Evolution and Inheritance</b>	Explore the natural world around them. Recognise some environments that are different to the one in which they live.			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
<b>Seasonal Changes</b>	Know about and recognise the signs of Spring, Summer, Autumn, Winter and make comparisons	Observe changes across the four seasons.  Observe and describe weather associated with the seasons and how day length varies.		
<b>Materials</b>	Explore collections of materials with similar and/or different properties.  Talk about the differences between materials and changes they notice.  <i>Know about freezing and melting</i>	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 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,	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.	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. Demonstrate that dissolving, mixing

		bending, twisting and stretching.		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.
<b>Rocks</b>	Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about the differences between materials and changes they notice. Explore the natural world around them.		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.	
<b>Light</b>	Explore the natural world around them. Understand the effect of changing seasons on the natural world around them. Explore how things work.		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.	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.
<b>Forces</b>	Explore and talk about different forces they can feel.		Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some	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,

			<p>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 two poles.          Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>	<p>including levers, pulleys and gears, allow a smaller force to have a greater effect</p>
<b>Sound</b>	<p>Listen with increased attention to sounds.</p>		<p>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 the sound source increases.</p>	
<b>Electricity</b>			<p>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</p>	<p>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.</p>



			conductors.	
<b>Earth and Space</b>	Explore the natural world around them. Recognise some environments that are different to the one in which they live.	Observe changes across the four seasons. (Seasonal changes)  Observe and describe weather associated with the seasons and how day length varies. (Seasonal changes)		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.

Progression of skills in Science at Hardy Mill						
EYFS	KS1		LKS2		UKS2	
	Y1	Y2	Y3	Y4	Y5	Y6
<i>Ask and answer simple questions</i>	<b>Asking simple questions and recognising that they can be answered in different ways</b> <ul style="list-style-type: none"> <li>While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.</li> <li>The children answer questions developed with the teacher often through a scenario.</li> <li>The children are involved in planning how to use resources provided to answer</li> </ul>		<b>Asking relevant questions and using different types of scientific enquiries to answer them</b> <ul style="list-style-type: none"> <li>The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions.</li> <li>The children answer questions posed by the teacher.</li> <li>Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be</li> </ul>		<b>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</b> <ul style="list-style-type: none"> <li>Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.</li> <li>Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise</li> </ul>	

	<p>the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.</p>	<p>answered through practical work. They identify the type of enquiry that they have chosen to answer their question.</p>	<p>how secondary sources can be used to answer questions that cannot be answered through practical work.</p> <ul style="list-style-type: none"> <li>The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.</li> </ul>
	<p><b>Observing closely, using simple equipment</b></p> <ul style="list-style-type: none"> <li>Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.</li> <li>They begin to take measurements, initially by comparisons, then using non-standard units.</li> </ul>	<p><b>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</b></p> <ul style="list-style-type: none"> <li>The children make systematic and careful observations.</li> <li>They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.</li> </ul>	<p><b>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</b></p> <ul style="list-style-type: none"> <li>The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale.</li> <li>During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).</li> </ul>
	<p><b>Performing simple tests</b></p> <ul style="list-style-type: none"> <li>The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.</li> </ul>	<p><b>Setting up simple practical enquiries, comparative and fair tests</b></p> <ul style="list-style-type: none"> <li>The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.</li> <li>They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern</li> </ul>	<p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</b></p> <ul style="list-style-type: none"> <li>The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or</li> </ul>

		seeking.	<p>writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.</p> <ul style="list-style-type: none"> <li>Children present the same data in different ways in order to help with answering the question.</li> </ul>
	<p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.</li> <li>They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.</li> </ul>	<p><b>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</b></p> <p><b>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</b></p> <ul style="list-style-type: none"> <li>The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.</li> <li>Children are supported to present the same data in different ways in order to help with answering the question.</li> </ul>	<p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments</b></p> <ul style="list-style-type: none"> <li>Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.</li> <li>They talk about how their scientific ideas change due to new evidence that they have gathered.</li> <li>They talk about how new discoveries change scientific understanding.</li> </ul>
	<p><b>Gathering and recording data to help in answering questions</b></p> <ul style="list-style-type: none"> <li>The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.</li> <li>They record their measurements e.g. using prepared tables, pictograms, tally charts and bar charts.</li> <li>They classify using simple prepared tables and sorting rings.</li> </ul>	<p><b>Using straightforward scientific evidence to answer questions or to support their findings</b></p> <ul style="list-style-type: none"> <li>Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.</li> </ul>	<p><b>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</b></p> <ul style="list-style-type: none"> <li>In their conclusions, children: identify causal relationships and patterns in the natural world from</li> </ul>

			<p>their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.</p> <ul style="list-style-type: none"> <li>• They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.</li> <li>• They identify any limitations that reduce the trust they have in their data.</li> <li>• They communicate their findings to an audience using relevant scientific language and illustrations.</li> </ul>
	<p><b>Using their observations and ideas to suggest answers to questions</b></p> <ul style="list-style-type: none"> <li>• Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.</li> <li>• The children recognise 'biggest and smallest', 'best and worst' etc. from their data.</li> </ul>	<p><b>Identifying differences, similarities or changes related to simple scientific ideas and processes</b></p> <ul style="list-style-type: none"> <li>• Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.</li> </ul>	<p><b>Using test results to make predictions to set up further comparative and fair tests</b></p> <ul style="list-style-type: none"> <li>• Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.</li> </ul>
		<p><b>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</b></p> <ul style="list-style-type: none"> <li>• They draw conclusions based on their evidence and current subject knowledge.</li> <li>• They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.</li> <li>• Children use their evidence to</li> </ul>	

			<p>suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface.</p> <ul style="list-style-type: none"> <li>• Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.</li> </ul>		
			<p><b>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</b></p> <ul style="list-style-type: none"> <li>• They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.</li> </ul>		