SCIENCE SUBJECT VISION AND DRIVERS

Subject Aims

At Silverdale St John's Primary School, our science teaching offers opportunities for children to:

- Access a broadly balanced, progressive curriculum, which develops a wide range of skills to enable children to work scientifically and develop their knowledge of life and living things, materials and their properties and physical processes.
- Develop scientific skills to explain and interpret a range of familiar phenomena in everyday life.
- Consider ways in which living things and the environment need care, protection and respect.
- Use both first hand experiences and secondary sources to investigate and acquire scientific knowledge.
- Develop skills and knowledge that will enable them to develop into healthy and happy individuals with an understanding of their place in the world.
- Use a range of methods to communicate their scientific information and present it in a systematic, scientific manner, including I.C.T., diagrams, graphs and charts.
- Develop a respect for the materials and equipment they handle with regard to their own, and other children's safety.

Subject Vision

At Silverdale St John's, we aim to give our students the opportunity to be curious and excited about the word around them and to investigate and find things out for themselves. We recognise the importance of science and its uses in all aspects of everyday life. Children will work scientifically to observe and understand what is happening and how and why things work, and to make predictions and analyse their findings. Children will be taught through the specific strands of science: biology, chemistry and physics and will develop their knowledge and understanding of these strands of science. We will encourage our students to develop their understanding of the nature, processes and methods of science, and we will provide opportunities for them to ask and answer scientific questions about our world. We also aim to equip our students with a knowledge and understanding of the uses and implications of science in our modern-day society.

Learning	Community	Faith
Children will access the curriculum in science at a level that is right for them, and they will revisit the strands of science in greater depth as they progress through the school. The practical nature of the subject allows students to take a 'hands-on' approach to their learning and will be given first hand learning experiences.	Children will be given the opportunity for learning both inside and outside of the classroom. We will utilise our school grounds and the local area for many of our science studies where appropriate. We will organise visits and trips out as well as inviting members of the community, who may be in a science role, to come in and talk to our children and share their experiences of science.	As science is a subject involving the world around us, children will be encouraged to show curiosity, awe and wonder for the natural world and natural phenomena. Children will learn to show respect and admiration for our natural world, and all of God's creations.

Inspiring success through learning, community and faith.

We strive to provide the Christian foundations to enable our children to make good decisions. Our children will be inspired, guided and supported to achieve success, as they are all of infinite worth. Taught through a creative curriculum, our children will become global citizens and will care for all of God's creation.

I can do all things through Christ who strengthens me.
Philippians 4:13

Year 1

Plants: Common Names and Basic Structure	Animals - Humans	Animals - Other Animals
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. **Notes and Guidance (non-statutory):** Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted. They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). **Pupils might work scientifically by:** ▪ Observing closely, perhaps using magnifying glasses. ▪ Comparing and contrasting familiar plants. ▪ Describing how they were able to identify and group them, and ▪ Drawing diagrams showing the parts of different plants including trees. ▪ Keeping records of how plants have changed over time, for example the leaves falling off trees and buds opening. ▪ Comparing and contrasting what they have found out about different plants.	Pupils should be taught to: ▪ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. ▪ Recognise that humans are animals. ▪ Compare and describe differences in their own features (eye, hair, skin colour, etc.). ▪ Recognise that humans have many similarities. **Notes and Guidance (non-statutory):** Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes. **Pupils might work scientifically by using their observations to:** ▪ Compare and contrast animals (humans) at first hand or through videos and photographs. ▪ Using their senses to compare different textures, sounds and smells.	Pupils should be taught 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, and including pets). ▪ Find out and describe how animals look different to one another. ▪ Group together animals according to their different features. ▪ Recognise similarities between animals: – Structure: head, body, way of moving, senses, body covering, tail. ▪ Animals have senses to explore the world around them and to help them to survive. ▪ Recognise that animals need to be treated with care and sensitivity to keep them alive and healthy. ▪ Animals are alive; they move, feed, grow, use their senses and reproduce. **Notes and Guidance (non-statutory):** Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat. They should understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils should become familiar with the common names of fish, amphibians, reptiles, birds and mammals, including those that are kept as pets. **Pupils might work scientifically by using their observations to:** ▪ Compare and contrast animals at first hand or through videos and photographs. ▪ Describing how they identify and group them. ▪ Grouping animals according to what they eat. ▪ Using their senses.

Material Properties – Everyday Materials	Light and Astronomy – Seasonal Change
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. **Notes and Guidance (non-statutory):** Pupils should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque and transparent. Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil. **Pupils might work scientifically by:** ▪ performing simple tests to explore questions, for example: – 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?'	Pupils should be taught to: ▪ Observe changes across the four seasons. ▪ Observe and describe weather associated with the seasons and how day length varies. **Notes and Guidance (non-statutory):** Pupils should observe and talk about changes in the weather and the seasons. **Note:** Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. **Pupils might work scientifically by:** ▪ Making tables and charts about the weather and ▪ Making displays of what happens in the world around them, including day length, as the seasons change. Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT across the curriculum ▪ This unit provides an ideal opportunity for using data logging equipment to record temperatures

Sort / group / compare / classify / identify	**Research** *finding things out using a wide range of secondary sources of information and recognising that scientific ideas change and develop over time*	**Modelling**	**Recording of 'Explore / Observe'** *developing a deeper understanding of a wide range of scientific ideas encountering more abstract ideas*	**Questioning** *asking their own questions about scientific phenomena*	**Planning** *using different types of scientific enquiry making decisions about and explaining choices for testing*
▪ Name/identify common examples and some common features (Y1/2). ▪ With help, decide how to sort and group objects, materials or living things. ▪ Say/identify how different things change objects, materials or living things. ▪ Make comparisons between simple observable features/characteristics of objects, materials and living things. ▪ Say how things are similar or different. ▪ Recognise basic features of objects, materials and living things.	▪ Find out about the work of famous scientists (historical & modern day) (Y1/2). ▪ Use simple and appropriate secondary sources (such as books, photographs and videos) to find things out / find answers. (Y1/2). ▪ Ask people questions (Y1/2).		▪ Begin to communicate and record their findings using simple scientific language. ▪ Begin to use simple scientific language to talk about what they have. ▪ Use their own ideas to offer answers to questions. ▪ Observe and discuss / talk about / draw/ keep records of changes over different periods of time. ▪ Observe closely and discuss / talk about / draw /record the features/properties of things in the real world.	▪ Ask simple questions stimulated by the world around them. ▪ Demonstrate curiosity by the questions they ask.	▪ Begin to choose/suggest ways to find answers. ▪ Perform simple tests/comparative tests. ▪ Talk about ways of answering their questions. ▪ Use different types of scientific enquiry. ▪ Experiment with a wide variety of things.

Equipment and measurement *increasing complexity with increasing accuracy and precision make their own decisions about the data to collect*	**Communicating Recording** *recording data, reporting findings, presenting findings*	**Considering the results of an investigation / writing a conclusion**			**Collaborating**
		Describe results *Looking for patterns analysing functions, relationships and interactions more systematically*	**Explain results** *Draw conclusions based on evidence*	**Trusting my results**	
▪ Observe using non-standard units e.g. how many lolly sticks/cubes/handfuls, etc. ▪ Observe closely, using simple equipment (e.g. hand lenses, egg timers). ▪ Observe closely using their senses (Y1).	▪ Present their findings in a range of ways using templates where necessary e.g. talk/discuss; write/describe; draw pictures; annotated photographs; video; make/construct tables, charts and displays. ▪ Communicate their ideas to a range of audiences in a variety of ways. ▪ Begin to use some simple scientific language.	▪ Sequence photographs of an event/observation. ▪ Observe changes over different periods of time and discuss/talk/record about what has happened. ▪ Talk/ discuss/ describe/record about what they have seen/ what has happened.	▪ Read and spell scientific vocabulary (Y1/2). ▪ Suggest how things happen. ▪ Use their observations and ideas to suggest answers to questions. ▪ Begin to use simple scientific language to talk about what they have found out. ▪ Talk about what they have found out.		

Year 2

Environment - Living things and their habitats	Animals - Animal survival and growth	Health – How we grow and stay healthy
Pupils should be taught to: ▪ 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. ▪ Different kinds of plants and animals live in different kinds of places. ▪ There are different kinds of habitat near school which need to be cared for ▪ Habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples). **Notes and Guidance (non-statutory):** Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. **Pupils might work scientifically by:** ▪ Sorting and classifying things as to whether they are living, dead or were never alive. ▪ Recording their findings using charts ▪ Describing how they decided where to place things, ▪ Exploring questions such as: 'Is a flame alive? Is a deciduous tree dead in winter?' ▪ Talking about ways of answering their questions. ▪ Constructing a simple food chain that includes humans (e.g. grass, cow, human); ▪ Describing the conditions in different habitats and micro-habitats (under log, on stony path, under bushes); ▪ Finding out how the conditions affect the number and type(s) of plants and animals that live there.	Pupils should be taught to: ▪ Notice that animals, have offspring which grow into adults. ▪ Find out about and describe the basic needs of animals, for survival (water, food and air). **Notes and Guidance (non-statutory):** Pupils should be introduced to the basic needs of animals for survival. They should also be introduced to the process of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. **Pupils might work scientifically by:** ▪ Observing, through video or first-hand observation and measurement, how different animals grow; ▪ Asking questions about what things animals need for survival suggesting ways to find answers to their questions.	Pupils should be taught to: ▪ Notice that humans, have offspring which grow into adults. ▪ Find out about and describe the basic needs of 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. ▪ Medicines can be useful when we are ill. ▪ Medicines can be harmful if not used properly. **Notes and Guidance (non-statutory):** Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the process of reproduction and growth in animals [humans]. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. Growing into adults can include reference to baby, toddler, child, teenager, adult. **Pupils might work scientifically by:** ▪ Observing, through video or first-hand observation and measurement, how humans grow. ▪ Recording their findings using charts. ▪ Asking questions about what things animals [humans]. need for survival and what humans need to stay healthy. ▪ Suggesting ways to find answers to their questions.

Plants – Plant growth)	Material Properties – Uses of Materials)

Pupils should be taught 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. ▪ Plants are living and eventually die **Notes and Guidance (non-statutory):** Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as the process of reproduction and growth in plants. **Note:** Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them. **Pupils might work scientifically by:** ▪ Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or ▪ Observing similar plants at different stages of growth; ▪ Setting up a comparative test to show that plants need light and water to stay healthy.	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 ▪ Some materials can be found naturally; others have to be made **Notes and Guidance (non-statutory):** Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials; for example, John Dunlop, Charles Macintosh or John McAdam. **Pupils might work scientifically by:** ▪ Comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); ▪ Observing closely, ▪ Identifying and classifying the uses of different materials, and ▪ Recording their observations. ▪ Thinking about unusual and creative uses for everyday materials.

Sort / group / compare / classify / identify	**Research** *finding things out using a wide range of secondary sources of information and recognising that scientific ideas change and develop over time*	**Modelling**	**Recording of 'Explore / Observe'** *developing a deeper understanding of a wide range of scientific ideas encountering more abstract ideas*	**Questioning** *asking their own questions about scientific phenomena*	**Planning** *using different types of scientific enquiry making decisions about and explaining choices for testing*

▪ Compare and contrast… a variety of things - focusing on the similarities as well as the differences] including how different things change over different periods of time [objects, materials or living things]. ▪ Sort and classify things according to a variety of different features (e.g. "I know it is living because it .. and it…). ▪ Decide how to sort and group objects, materials or living things. ▪ Name/identify a variety of common features and/or uses for objects, materials or living things. ▪ Name/Identify common examples and some common features.	▪ Find out about the work of famous scientists - historical & modern day (Y1/2). ▪ Use simple and appropriate secondary sources (such as books, photographs and videos) to find things out / find answers. (Y1/2). ▪ Ask people questions (Y1/2).		▪ Record and communicate their findings using simple scientific language. ▪ Use their own ideas and their observations to offer answers to questions. ▪ Observe and describe simple processes/cycles with several steps e.g. growth cycle, simple food chain, saying how living things depend on one another. ▪ Recognise and describe a series of changes over time (e.g. growth). ▪ Observe, and record make drawings to represent things in the real world with some accuracy.	▪ Raise their own questions based on or linked to things they have observed.	▪ Set up a comparative test. ▪ In a group choose/suggest ways in which they might answer scientific questions. ▪ Suggest a [practical way] to find answers to their questions [and listen to the suggestions of others. ▪ Use different types of scientific enquiry to answer their own questions.
Equipment and measurement *increasing complexity with increasing accuracy and precision make their own decisions about the data to collect*	**Communicating Recording** *recording data, reporting findings, presenting findings*	**Considering the results of an investigation / writing a conclusion** **Describe results** *Looking for patterns analysing functions, relationships and interactions more systematically*	**Explain results** *Draw conclusions based on evidence*	**Trusting my results**	**Collaborating**
▪ Observe more accurately by measuring non-standard and standard units. ▪ Use their senses, simple measurements and equipment to gather data with increasing independence. ▪ Gather data to help in answering questions.	▪ Record and communicate their findings in a range of ways with increasing independence e.g. talk/discuss; write/describe; draw pictures; take photographs; video; make/construct a variety of tables, charts [including simple, bar charts produced as a group and displays. ▪ Make some choices on how to communicate their ideas to a range of audiences in a variety of ways. ▪ Use simple scientific language in their recording. ▪ Record simple data with some accuracy. ▪ Record data to help in answering questions.	▪ With guidance, begin to notice patterns and relationships. ▪ Order their findings. ▪ Recognise if results matched predictions. ▪ Talk/ discuss/ describe/record with some accuracy what they have seen/ what has happened.	▪ Begin to explain how they know…use the word because "it is because…." (Y2) / suggest how and/or why things happen. ▪ Draw on use their results and their own experience to answer their questions. ▪ Begin to use simple scientific language to describe or explain what they have found out. ▪ Read and spell scientific vocabulary.		▪ Listen to the suggestions of others.

Year 3

Environment - Living things and their habitats	Animals - Animal survival and growth	Health – How we grow and stay healthy
Pupils should be taught to: ▪ 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. ▪ Different kinds of plants and animals live in different kinds of places. ▪ There are different kinds of habitat near school which need to be cared for ▪ Habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples). **Notes and Guidance (non-statutory):** Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. **Pupils might work scientifically by:** ▪ Sorting and classifying things as to whether they are living, dead or were never alive. ▪ Recording their findings using charts ▪ Describing how they decided where to place things, ▪ Exploring questions such as: 'Is a flame alive? Is a deciduous tree dead in winter?' ▪ Talking about ways of answering their questions. ▪ Constructing a simple food chain that includes humans (e.g. grass, cow, human); ▪ Describing the conditions in different habitats and micro-habitats (under log, on stony path, under bushes); ▪ Finding out how the conditions affect the number and type(s) of plants and animals that live there.	Pupils should be taught to: ▪ Notice that animals, have offspring which grow into adults. ▪ Find out about and describe the basic needs of animals, for survival (water, food and air). **Notes and Guidance (non-statutory):** Pupils should be introduced to the basic needs of animals for survival. They should also be introduced to the process of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. **Pupils might work scientifically by:** ▪ Observing, through video or first-hand observation and measurement, how different animals grow; ▪ Asking questions about what things animals need for survival suggesting ways to find answers to their questions.	Pupils should be taught to: ▪ Notice that humans, have offspring which grow into adults. ▪ Find out about and describe the basic needs of 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. ▪ Medicines can be useful when we are ill. ▪ Medicines can be harmful if not used properly. **Notes and Guidance (non-statutory):** Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the process of reproduction and growth in animals [humans]. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. Growing into adults can include reference to baby, toddler, child, teenager, adult. **Pupils might work scientifically by:** ▪ Observing, through video or first-hand observation and measurement, how humans grow. ▪ Recording their findings using charts. ▪ Asking questions about what things animals [humans]. need for survival and what humans need to stay healthy. ▪ Suggesting ways to find answers to their questions.
Plants – Plant growth)	**Material Properties – Uses of Materials)**	

Pupils should be taught 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. ▪ Plants are living and eventually die **Notes and Guidance (non-statutory):** Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as the process of reproduction and growth in plants. **Note:** Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them. **Pupils might work scientifically by:** ▪ Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or ▪ Observing similar plants at different stages of growth; ▪ Setting up a comparative test to show that plants need light and water to stay healthy.	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 ▪ Some materials can be found naturally; others have to be made **Notes and Guidance (non-statutory):** Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials; for example, John Dunlop, Charles Macintosh or John McAdam. **Pupils might work scientifically by:** ▪ Comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); ▪ Observing closely, ▪ Identifying and classifying the uses of different materials, and ▪ Recording their observations. ▪ Thinking about unusual and creative uses for everyday materials.

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▪ Compare and contrast… a variety of things - focusing on the similarities as well as the differences] including how different things change over different periods of time [objects, materials or living things]. ▪ Sort and classify things according to a variety of different features (e.g. "I know it is living because it .. and it…). ▪ Decide how to sort and group objects, materials or living things. ▪ Name/identify a variety of common features and/or uses for objects, materials or living things. ▪ Name/Identify common examples and some common features.	▪ Find out about the work of famous scientists - historical & modern day (Y1/2). ▪ Use simple and appropriate secondary sources (such as books, photographs and videos) to find things out / find answers. (Y1/2). ▪ Ask people questions (Y1/2).		▪ Record and communicate their findings using simple scientific language. ▪ Use their own ideas and their observations to offer answers to questions. ▪ Observe and describe simple processes/cycles with several steps e.g. growth cycle, simple food chain, saying how living things depend on one another. ▪ Recognise and describe a series of changes over time (e.g. growth). ▪ Observe, and record make drawings to represent things in the real world with some accuracy.	▪ Raise their own questions based on or linked to things they have observed.	▪ Set up a comparative test. ▪ In a group choose/suggest ways in which they might answer scientific questions. ▪ Suggest a [practical way] to find answers to their questions [and listen to the suggestions of others. ▪ Use different types of scientific enquiry to answer their own questions.
Equipment and measurement *increasing complexity with increasing accuracy and precision make their own decisions about the data to collect*	**Communicating Recording** *recording data, reporting findings, presenting findings*	**Considering the results of an investigation / writing a conclusion** **Describe results** *Looking for patterns analysing functions, relationships and interactions more systematically*	**Explain results** *Draw conclusions based on evidence*	**Trusting my results**	**Collaborating**
▪ Observe more accurately by measuring non-standard and standard units. ▪ Use their senses, simple measurements and equipment to gather data with increasing independence. ▪ Gather data to help in answering questions.	▪ Record and communicate their findings in a range of ways with increasing independence e.g. talk/discuss; write/describe; draw pictures; take photographs; video; make/construct a variety of tables, charts [including simple, bar charts produced as a group and displays. ▪ Make some choices on how to communicate their ideas to a range of audiences in a variety of ways. ▪ Use simple scientific language in their recording. ▪ Record simple data with some accuracy. ▪ Record data to help in answering questions.	▪ With guidance, begin to notice patterns and relationships. ▪ Order their findings. ▪ Recognise if results matched predictions. ▪ Talk/ discuss/ describe/record with some accuracy what they have seen/ what has happened.	▪ Begin to explain how they know…use the word because "it is because…." (Y2) / suggest how and/or why things happen. ▪ Draw on use their results and their own experience to answer their questions. ▪ Begin to use simple scientific language to describe or explain what they have found out. ▪ Read and spell scientific vocabulary.		▪ Listen to the suggestions of others.

Year 4

Environment – Living things and their habitats)	Animals – Teeth, Eating and Digestion)
Pupils should be taught 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. ▪ Use and make identification keys for plants and animals. **Notes and Guidance (non-statutory):** Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants, Pupils could begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. **Note:** Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses. Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks or garden ponds, and the negative effects of population and development, litter or deforestation. **Pupils might work scientifically by:** ▪ Using and making simple guides or keys [sorting, grouping, comparing, classifying] to explore and identify local plants and animals. ▪ Making a guide [sorting, grouping, comparing, classifying] to local living things. ▪ Raising and answering questions based on their observations of animals. ▪ What they have found out about other animals that they have researched.	Pupils should be taught 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. ▪ Describe how teeth and gums have to be cared for in order to keep them healthy. **Notes and Guidance (non-statutory):** Pupils should be introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them understand their special functions. **Pupils might work scientifically by:** ▪ Comparing the teeth of carnivores and herbivores. ▪ Suggesting reasons for differences. ▪ Finding out what damages teeth and how to look after them. ▪ Drawing and discussing their ideas about the digestive system. ▪ Comparing them with models or images.

Material Properties and Changes – States of Matter)

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.
- Solids, liquids and gases can be identified by their observable properties.
- Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action).
- Liquids can pour and take the shape of the container in which they are put.
- Liquids form a pool not a pile.
- Solids in the form of powders can pour as if they were liquids but make a pile not a pool.
- Gases fill the container in which they are put.
- Gases escape from an unsealed container.
- Gases can be made smaller by squeezing/pressure.
- Liquids and gases can flow.

Notes and Guidance (non-statutory):

Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled.
Note: Teachers should avoid using materials where heating is associated with chemical change, e.g. through baking or burning.

Pupils might work scientifically by:

- Grouping and classifying a variety of different materials.
- Exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party).
- Researching the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid.
- Observing and recording evaporation over a period of time, such as a puddle in the playground or washing on a line.
- Investigating the effect of temperature on washing drying or snowmen melting.
- Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT.
- This unit provides an ideal opportunity for using data logging equipment to detect/measure and compare temperatures.

Sound

Pupils should be taught to:

Vibrations

- 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 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.
- Sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body).
- Sounds travel away from their source in all directions.
- Vibrations may not always be visible to the naked eye.

Pitch

- Find patterns between the pitch of a sound and features of the object that produced it.
- Sounds can be high or low pitched.
- The pitch of a sound can be altered.
- Pitch can be altered either by changing the material, tension, thickness or length of vibrating objects or changing the length of a vibrating air column.

Muffling/blocking sounds

- Recognise that vibrations from sounds travel through a medium to the ear.
- Sounds are heard when they enter our ears (although the structure of the ear is not important key learning at this age phase).
- Sounds can travel through solids, liquids and air/gas by making the materials vibrate.
- Sound travel can be reduced by changing the material that the vibrations travel through.
- Sound travel can be blocked.

Notes and Guidance (non-statutory):

Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways.

Pupils might work scientifically by:

- Finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.
- They might make ear muffs from a variety of different materials to investigate which provides the best insulation against sound.
- They could make and play their own instruments by using what they have found out about pitch and volume.

Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT across the curriculum

- This unit provides an ideal opportunity for using data logging equipment to detect/measure and compare sounds.

Electricity

Pupils should be taught 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.
- Electricity can be dangerous.
- Electricity sources can be mains or battery.
- Batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work.
- Faults in circuits can be found by methodically testing connections.
- Drawings, photographs and diagrams can be used to represent circuits (although standard symbols need not be introduced until UKS2).

Notes and Guidance (non-statutory):

Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in Year 6.
Note: Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.

Pupils might work scientifically by:

- Observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

Sort / group / compare / classify / identify	**Research** *finding things out using a wide range of secondary sources of information and recognising that scientific ideas change and develop over time*	**Modelling**	**Recording of 'Explore / Observe'** *developing a deeper understanding of a wide range of scientific ideas encountering more abstract ideas*	**Questioning** *asking their own questions about scientific phenomena*	**Planning** *using different types of scientific enquiry making decisions about and explaining choices for testing*
▪ Make a simple guide to local living things. ▪ Use guides or simple keys to classify / identify [local small invertebrates]. ▪ Use their observations] to identify and classify. ▪ Record similarities, differences or changes related to simple scientific ideas or processes or more complex groups of objects/living things/events and begin to give reasons for these.	▪ Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. ▪ Create/invent/ design something based on what they have found out applying both research and/or practical experiences. (Y3/4). ▪ Find out about the work of famous scientists (historical & modern day) (Y3/4).	▪ Make a visual representation or a model of something to represent something they have seen or a process that is difficult to see. ▪ Suggest their own ideas on a concept and compare these with models or images.	▪ Suggest their own ideas on a concept and compare these with what they observe / find out. ▪ Develop simple descriptions from their observations use relevant scientific language to discuss their ideas. ▪ Observe and record relationships between structure and function (Y3/4). ▪ Observe and record changes /stages over time (Y3/4). ▪ Explore / observe things in the local environment / real contexts and record observations (Y3/4).	▪ Choose/select a relevant question that can be answered [by research or experiment/test]. ▪ Ask/raise their own relevant questions with increasing confidence and independence about what they observe and about the world around them.	▪ Investigate the effect of something on something else. ▪ Start to make their own decisions about the most appropriate type of science enquiry they might use to answer scientific questions [is a fair test the best way to investigate their question]. ▪ Recognise when a test is necessary. ▪ Carry out simple fair tests [with increasing confidence and make some of the planning decisions about what to change and measure/observe].
Equipment and measurement *increasing complexity with increasing accuracy and precision make their own decisions about the data to collect*	**Communicating Recording** *recording data, reporting findings, presenting findings*	**Considering the results of an investigation / writing a conclusion** **Describe results** *Looking for patterns analysing functions, relationships and interactions more systematically*	**Explain results** *Draw conclusions based on evidence*	**Trusting my results**	**Collaborating**
▪ Begin to identify where patterns might be found and use this to begin to identify what data to collect. ▪ Make more of the decisions about what observations to make, how long to make them for and the type of equipment that might be used. ▪ Learn how to use new equipment, such as data loggers & measure temperature in degrees Celsius (°C) using a thermometer. ▪ Understand precautions for working safely. ▪ Collect and record data from their own observations and measurements, using notes/simple tables/standard units, to help to make decisions. ▪ Make accurate measurements using standard units [and more complex units and parts of units] using a range of equipment.	▪ Record findings using simple scientific language and vocabulary, including discussions, oral and written explanations, notes, drawings (annotated), pictorial representations, labelled diagrams, tables and bar charts [where intervals and ranges agreed through discussion], displays or presentations. ▪ Begin to select the most useful ways to record, classify and present data from a range of choices. ▪ Make decisions on how best to] communicate their findings in ways that are appropriate for different audiences. (Y3/4)	▪ Notice/find patterns in their observations and data. ▪ Describe the effect of something/different factors on something else. ▪ Help to make decisions about how to analyse their data.	▪ Begin to develop their ideas about relationships and interactions. ▪ Reporting on findings from enquiries [beginning to identify the scientific facts in their data]. ▪ Use relevant scientific language to discuss, communicate, report their findings. ▪ Read and spell scientific vocabulary correctly and with confidence (Y3/4).	▪ Use results to suggest improvements, new questions and predictions for setting up further tests. ▪ With help, pupils should look for similarities and differences in their data [between different groups of results].	▪ Make a visual representation or a model of something to represent something they have seen or a process that is difficult to see. ▪ Suggest their own ideas on a concept and compare these with models or images.

Year 5

Environment - Observing Life cycles

Pupils should be taught 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.

Notes and Guidance (non-statutory):
Pupils should study and raise questions about their local environment throughout the year. They should observe life-cycle changes in a variety of living things, for example plants in the vegetable garden or flower border, and animals in the local environment. They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.
Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants and sexual reproduction in animals.

Pupils might work scientifically by:
- Observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times).
- Asking pertinent questions.
- Suggesting reasons for similarities & differences.
- They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs.
- Observe changes in an animal over a period of time (for example, by hatching and rearing chicks).
- Comparing how different animals reproduce and grow.

Material Properties – Testing Material Properties

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.
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
- Compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity).

Temperature and Thermal Insulation
- Heat always moves from hot to cold.
- Some materials (insulators) are better at slowing down the movement of heat than others.
- Objects/liquids will warm up or cool down until they reach the temperature of their surroundings.

Notes and Guidance (non-statutory):
Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials and relating these to what they learnt about magnetism in Year 3 and about electricity in Year 4.

Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them.

Pupils might work scientifically by:
- Carry out tests to answer questions such as 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?'
- Compare materials in order to make a switch in a circuit.

Material Changes - Reversible changes

- 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.
- Demonstrate that dissolving, mixing and changes of state are reversible changes.
- Changes can occur when different materials are mixed.
- Some material changes can be reversed and some cannot.
- Recognise that dissolving is a reversible change.
- Distinguish between melting and dissolving.
- Mixtures of solids (of different particle size) can be separated by sieving.
- Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (un-dissolved).
- Evaporation helps us separate soluble materials from water.
- Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind speed).
- Freezing, melting and boiling changes can be reversed (revision from YR4).

Notes and Guidance (non-statutory):
Pupils should explore reversible changes including evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.

Material Changes – Irreversible changes

Pupils should be taught to:
- 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.

Notes and Guidance (non-statutory):
Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.
Note: Safety guidelines should be followed when burning materials.
Pupils might work scientifically by:
- Observing and comparing the changes that take place, for example, when burning different materials or baking bread or cakes.
- Researching and discussing how chemical changes have an impact on our lives, for example cooking.
- Discuss [research] the creative use of new materials such as polymers, super-sticky and super-thin materials.

Light and Astronomy – Earth and Space

Forces – Effects on Movement

Animals - Human Life Cycles		
Pupils should be taught to: ▪ Describe the changes as humans develop to old age. ▪ Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete. **Notes and Guidance (non-statutory):** Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty. **Pupils might work scientifically by:** ▪ Researching the gestation periods other animals and comparing them with humans. ▪ By finding out and recording the length and mass of a baby as it grows.	Pupils should be taught 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 Sun/Earth/Moon as approximately spherical bodies. ▪ Use the idea of the Earth's rotation to explain day and night. ▪ The Earth spins once around its own axis in 24 hours, giving day and night. ▪ The Earth orbits the Sun in one year. ▪ We can see the Moon because the Sun's light reflects off it. ▪ The Moon orbits the Earth in approximately 28 days and changes to the appearance of the moon are evidence of this. ▪ The Sun appears to move across the sky from East to West and this causes shadows to change during the day. ▪ Changes to shadow length over a day or changes to sunrise and sunset times over a year are evidence supporting the movement of the Earth. **Notes and Guidance (non-statutory):** Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). **Note:** Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils should find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. **Pupils might work scientifically by:** ▪ Comparing the time of day at different places on the Earth through internet links and direct communication. ▪ Creating simple models of the solar system. ▪ Constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day. ▪ Finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.	Pupils should be taught 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. ▪ There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity). ▪ Gravity can act without direct contact between the Earth and an object. ▪ Friction, air resistance and water resistance are forces which slow down moving objects. ▪ Friction, air resistance and water resistance can be useful or unwanted. ▪ The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect. ▪ More than one force can act on an object simultaneously (either reinforcing or opposing each other). **Notes and Guidance (non-statutory):** Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. **Pupils might work scientifically by:** ▪ Exploring falling paper cones or cup-cake cases. ▪ Designing and making [exploring] a variety of parachutes. ▪ Carrying out fair tests to determine which designs are the most effective. ▪ Exploring resistance in water by making and testing boats of different shapes. ▪ Design and make artefacts that use simple levers, pulleys, gears and/or springs and explore their effects.

Sort / group / compare / classify / identify	Research *finding things out using a wide range of secondary sources of information and recognising that scientific ideas change and develop over time*	Modelling	Recording of 'Explore / Observe' *developing a deeper understanding of a wide range of scientific ideas encountering more abstract ideas*	Questioning *asking their own questions about scientific phenomena*	Planning *using different types of scientific enquiry making decisions about and explaining choices for testing*
▪ Compare and contrast things beyond their locality. ▪ Compare more complex processes, systems, functions (e.g. life cycles of different living things, organ systems of different animals). ▪ Suggest reasons for similarities and differences.	▪ Research the work of famous scientists (historical and modern day) and use this to find out how scientific ideas have changed over time. ▪ Find things out using a wide range of secondary sources of information.	▪ Create simple models to describe scientific ideas (e.g. circulatory system). ▪ Use simple models to describe scientific ideas (e.g. of movements of the Sun and Earth, solar system, shadow clocks, magnetic compasses for navigation).	▪ Read, spell and pronounce scientific vocabulary correctly (Y5/6). ▪ Use their developing scientific knowledge and understanding and relevant scientific language to discuss, communicate and explain their findings. ▪ Explore more abstract systems/functions/changes and record their understanding of these (e.g. circulatory system). ▪ Observe changes over different periods of time.	▪ Raise different kinds of questions (Y5/6) ▪ Refine a scientific questions so that it can be investigated. ▪ Ask their own pertinent questions.	▪ Explain which variables need to be controlled and why. ▪ Make most of the planning decisions about] and carry out fair tests. ▪ Recognise when it is appropriate to carry out a fair test and plan how to set it up.

Equipment and measurement *increasing complexity with increasing accuracy and precision make their own decisions about the data to collect*	Communicating Recording *recording data, reporting findings, presenting findings*	Considering the results of an investigation / writing a conclusion			Collaborating
		Describe results *Looking for patterns analysing functions, relationships and interactions more systematically*	Explain results *Draw conclusions based on evidence*	Trusting my results	
▪ Recording data and results of increasing complexity (Y5/6). ▪ Follow safety guidelines (Y5/6). ▪ Make their own decisions about what observations to make or measurements to use and how long to make them for [recognising the need for repeat readings on some occasions]. ▪ Decide how to record data from a choice of familiar approaches. ▪ Choose the most appropriate equipment to make measurements. ▪ Explain how to use equipment accurately.	▪ Record data and results of increasing complexity using tables, bar and line graphs, and models. ▪ Report findings from enquiries using discussion, drawings [annotated], oral and written explanations of results, and conclusions. ▪ Present findings in written form, displays and other presentations (Y5/6)	▪ Identify patterns that might be found in the natural environment. ▪ Look for patterns and notice relationships between things [and describe these].	▪ Use their developing scientific knowledge and understanding and relevant scientific language to explain their findings. ▪ Draw conclusions based on their data and observations. ▪ Read, spell and pronounce scientific vocabulary correctly (Y5/6).	▪ Use test results to make predictions to set up further comparative and fair tests. ▪ Comment on how reliable their data is.	

Year 6

Environment - Classification	Environment - Evolution And Inheritance	Animals/Health – Exercise, Health & The Circulatory System

Pupils should be taught 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.
- Living things can be grouped into micro-organisms, plants and animals.
- Vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals.
- Invertebrates can be grouped as snails and slugs, worms, spiders and insects.
- Plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses).

Notes and Guidance (non-statutory):

Pupils should build on their learning about grouping living things in Year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (e.g. insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.

Pupils might work scientifically by:

- Using classification systems and keys.
- Identifying some animals and plants in the immediate environment.
- Researching unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Pupils should be taught 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.

Notes and Guidance (non-statutory):

Building on what they have learnt about fossils in the topic on rocks in Year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.

Note: At this stage, pupils are not expected to understand how genes and chromosomes work.

Pupils might work scientifically by:

- Observing and raising questions about local animals and how they are adapted to the environment.
- Comparing how some living things adapt to survive in extreme conditions, e.g. cactuses, penguins and camels.
- Analysing the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

Pupils should be taught 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.
- The heart is a major organ and is made of muscle.
- The heart pumps blood around the body through vessels and this can be felt as a pulse.
- The heart pumps blood through the lungs in order to obtain a supply of oxygen.
- Blood carries oxygen/essential materials to different parts of the body.
- During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase.
- Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete.
- An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals).
- Tobacco, alcohol and other 'drugs' can be harmful.
- All medicines are drugs, not all drugs are medicines.

Notes and Guidance (non-statutory):

Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.

Pupils might work scientifically by:

- Exploring the work of scientists.
- Scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

*Additional suggestion beyond NC2014 to support pupils working scientifically and to provide an opportunity to use ICT to collect/interpret data

- Observing/Measuring changes to breathing, heart beat and or pulse rates after exercise.

Light and Astronomy – How Light Travels	Electricity
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 the light that 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. **Notes and Guidance (non-statutory):** Pupils should build on the work in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. **Pupils might work scientifically by:** ▪ Deciding [observe/explore] where to place rear-view mirrors on cars. ▪ Designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. ▪ Investigating the relationship between light sources, objects and shadows by using shadow puppets. ▪ Extend their experience [explore and observe] of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).	Pupils should be taught 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. ▪ Circuit diagrams can be used to construct a variety of more complex circuits predicting whether they will 'work'. **Notes and Guidance (non-statutory):** Building on their work in Year 4, pupils should construct simple series circuits, to help them answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. **Note:** Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity. **Pupils might work scientifically by:** ▪ Systematically identifying the effect of changing one [thing] component at a time in a circuit. ▪ Designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

Sort / group / compare / classify / identify	**Research** *finding things out using a wide range of secondary sources of information and recognising that scientific ideas change and develop over time*	**Modelling**	**Recording of 'Explore / Observe'** *developing a deeper understanding of a wide range of scientific ideas encountering more abstract ideas*	**Questioning** *asking their own questions about scientific phenomena*	**Planning** *using different types of scientific enquiry making decisions about and explaining choices for testing*
▪ Compare and contrast things beyond their locality and analyse advantages/disadvantages, pros/cons of their findings. ▪ Use and develop classification systems, keys and other information records [databases] to classify or identify. ▪ Compare and contrast more complex processes, systems, functions (e.g. sexual and asexual reproduction).	▪ [Research the work of famous scientists (historical & modern day) and use this to] explain how scientific ideas have developed over time and had an impact on our lives. ▪ Interview [people to find out information and collect data]. ▪ Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.	▪ [Identify some positives and some limitations of models used to describe/explain scientific ideas]. ▪ Use and make own versions of simple models to describe and explain scientific ideas (e.g. periscopes, simple lever, burglar alarm).	▪ Encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. ▪ Use correct scientific knowledge and understanding and relevant scientific language to explain their findings and justify their scientific ideas. ▪ Explore more abstract systems/functions /changes/behaviours and record their understanding of these (e.g. the relationship between diet, exercise, drugs, lifestyle and health; evolutionary	▪ Recognise scientific questions that do not yet have definitive answers. ▪ Use observations/data gathered to construct a further (testable or research) question. ▪ Raise different kinds of questions (Y5/6).	▪ Plan enquiries, including recognising and controlling variables where necessary. ▪ Select and plan the most appropriate type of science enquiry to use to answer scientific questions.

			changes; burning, rusting; reflection and refraction of light; friction, air resistance, gravity). ▪ Read, spell and pronounce scientific vocabulary correctly.		
Equipment and measurement *increasing complexity with increasing accuracy and precision make their own decisions about the data to collect*	**Communicating Recording** *recording data, reporting findings, presenting findings*	**Considering the results of an investigation / writing a conclusion**			**Collaborating**
		Describe results *Looking for patterns analysing functions, relationships and interactions more systematically*	**Explain results** *Draw conclusions based on evidence*	**Trusting my results**	
▪ Recognise that data might be unreliable and describe how to make it more reliable. ▪ Make their own decisions about what measurements to take [and identify the ranges and intervals used]. ▪ Take measurements, using a range of equipment, with increasing accuracy and precision. ▪ Choose and use the most appropriate equipment to support observation, make measurements, collect data. ▪ Record data and results of increasing complexity (Y5/6) ▪ Follow [and suggest] safety guidelines.	▪ Make decisions on the most appropriate format to present scientific data. ▪ Record data and results of increasing complexity using scientific diagrams and labels, recognised symbols, classification keys, tables, bar and line graphs, and models. ▪ Report findings from enquiries using discussion, drawings [annotated], oral and written explanations of results, explanations involving causal relationships, and conclusions. ▪ Present findings in written form, displays and other presentations (Y5/6).	▪ Look for different causal (cause and effect) relationships in their data (something effecting something else) and (describe the pattern succinctly). ▪ Identify patterns that might be found in the natural environment over long periods of time and describe how these have been used to develop scientific theories (e.g. evolution).	▪ Identify evidence that refutes or supports their ideas (Y5/6). ▪ Use their evidence to justify their ideas. ▪ Use correct scientific knowledge and understanding and relevant scientific language to explain their findings. ▪ Read, spell and pronounce scientific vocabulary correctly (Y5/6).	▪ Use their results to identify when further comparative tests and observations might be needed. ▪ Be able to explain differences in repeated measurements/readings or unexpected results. ▪ Recognise the limitations of some data.	