Coton-in-the-Elms Primary School - Subject Specific Curriculum Intent – Science

What is Science?

Science is the systematic study of the structure and behaviour of the physical and natural world through observation, experimentation, and the testing of theories against the evidence obtained.

Science links to a number of core abilities: Questioning and curiosity, critical thinking, investigating and problem solving.

What is the curriculum INTENT for this area of the curriculum?	Rationale – Why is this what you want our children to know?
1. Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics 2. 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 3. Equip children with the scientific knowledge required to understand the uses and implications of science, today and for the future	1. Children will be equipped with scientific knowledge and investigative skills for their future. 2. They are able to see the relevance of science in their own lives, and imagine future science related careers based upon it. 3. They have a curiosity about the natural world; empathy for the people who live in it and understand how humans can impact upon Earth. 4. Science encourages the power of rational explanation by promoting logic, honesty and creativity, formulation of questions, interpretation of evidence and coordination of these with theories. 5. Modern Society needs citizens who are skilled rational problem solvers in their daily lives. 6. The ability to research, report, collaborate and communicate, whilst demonstrating ethical principles and negotiation skills, is beneficial for any career. 7. Enquiry based science, through communication, has been shown to improve reading and writing abilities. 8. Along with the general skills gained in literacy, numeracy and ICT, there are also cross curricular links with health and sex education, citizenship and sustainable futures.

	EYFS	Years 1	Years 2	Years 3	Year 4	Year 5	Year 6
Animals including humans	To know that different animals have different body parts. To know that different animals like different foods and live in difference places To know that some animals are big and some animals are small To know that butterflies do not start out looking like butterflies To know how to talk about different places an animal might live To know that some animals hibernate To know that some animals are adapted to live under the sea and that humans are adapted to live on land To know that if I wash my hands then that will kill off germs	**To describe and compare observable features of animals from a range of groups** **To group animals according to what they eat** To identify and name a variety of common animals including fish, amphibians, reptiles, mammals and birds To identify and name a variety of common animals that are carnivores, herbivores and omnivores **To name and locate parts of the human body, including those related to the senses** **To describe and compare observable features of animals from a range of groups** To describe and compare the structure of a variety of common animals To identify, name, draw and label the	**To name and locate parts of the human body, including those related to the senses and describe them** **To describe the basic needs of animals for survival and the main changes as offspring from young animals, including humans, grow into adults** **To group animals according to what they eat, describe how animals get their food from other animals and/or plants, and use simple food chains to describe these relationships** **T**o describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene To describe the basic needs of animals, including humans, for survival To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene To describe the importance for humans of exercise, eating the right amounts of	To 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 To identify that humans and some other animals have skeletons and muscles for support, protection and movement	To describe the simple functions of the basic parts of the digestive system in humans To identify the different types of teeth in humans and their simple functions To construct and interpret a variety of food chains, identifying producers, predators and prey	To describe the changes as humans develop to old age	To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function To describe the ways in which nutrients and water are transported within animals, including humans

	To know about the importance of a healthy diet To know I cannot eat unhealthy foods everyday and I need a variety of food To know about the importance of a healthy exercise regime To know that exercise is good for my body.	basic parts of the human body and say which part of the body is associated with each sense To know how to take care of animals taken from their habitat and understand the need to return them safely to their homes	different types of food, and hygiene				
Seasonal changes	To identify that it is Autumn, Winter, Summer and Spring To identify seasonal colours To know that lots of new life begins in the Spring time To choose appropriate clothing for the seasons	**To observe and describe changes across the four seasons** To observe and describe weather associated with the seasons and how day length varies To know that it is not safe to look directly at the sun, even when wearing dark glasses					
Plants	To know that plants need sun to grow To know that plants need water to grow To know that most plants need soil and nutrients to grow To know some plants grow from seeds	To identify and name a variety of common wild and garden plants, including deciduous and evergreen tree To identify and describe the basic structure of a variety of common flowering plants, including trees To identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	**To describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants** To observe and describe how seeds and bulbs grow into mature plants To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	To identify and describe the functions of different parts of flowering plants To explore the requirements of plants for life and growth and how they vary from plant to plant To investigate the way in which water is transported within plants To explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal			
Living things and their habitats	To know about similarities and differences in relation to living things and their habitats To talk about the features of my own immediate environment and		**To identify whether things are alive, dead or have never lived** To explore and compare the differences between things that are living, dead, and things that have never been alive **To name different plants and animals and describe**		To recognise that living things can be grouped in a variety of ways To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird To describe the life process of reproduction in some plants and animals	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 To give reasons for classifying plants and animals based on specific characteristics

	how environments might vary from one another To make observations of animals and plants and explain why some things occur, and talk about changes.		**how they are suited to different habitats** To 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 To identify and name a variety of plants and animals in their habitats, including micro-habitats To 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		To recognise that environments can change and that this can sometimes pose dangers and have an impact on living things		
Evolution & inheritance							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 To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
Everyday Materials, rocks and states of matter	To know that objects are made from different materials To know about similarities and differences in relation to places, objects, materials and living things To know how to about the features of my immediate environment and how environments might vary from one another	**To distinguish objects from materials, describe their properties, identify and group everyday materials** To distinguish between an object and the material from which it is made To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock	**To distinguish objects from materials, describe their properties, identify and group everyday materials and compare their suitability for different uses** 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 To describe how the shapes of solid objects made from some materials can be	To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties To describe in simple terms how fossils are formed when things that have lived are trapped within rock To recognise that soils are made from rocks and organic matter.	To compare and group materials together, according to whether they are solids, liquids or gases To 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) To identify the part played by evaporation and condensation in the	To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity), and response to magnets To recognise that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating To give reasons, based on evidence from comparative and fair tests, for the	

	To know how to make observations of animals and plants and explain why some things occur, and talk about changes	To describe the simple physical properties of a variety of everyday materials To compare and group together a variety of everyday materials on the basis of their simple physical properties	changed by squashing, bending, twisting and stretching		water cycle and associate the rate of evaporation with temperature	particular uses of everyday materials, including metals, wood and plastic To demonstrate that dissolving, mixing and changes of state are reversible changes 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	
Sound & Light				To recognise that he/she needs light in order to see things and that dark is the absence of light To notice that light is reflected from surfaces To recognise that light from the sun can be dangerous and that there are ways to protect eyes To find patterns in the way that the size of shadows change To know that it is not safe to look directly at the sun, even when wearing dark glasses	To identify how sounds are made, associating some of them with something vibrating To recognise that vibrations from sounds travel through a medium to the ear To find patterns between the pitch of a sound and features of the object that produced it To find patterns between the volume of a sound and the strength of the vibrations that produced it To recognise that sounds get fainter as the distance from the sound source increases		To recognise that light appears to travel in straight lines To 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 To 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 To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
Forces & Magnets	To know that magnets are 'sticky' without being sticky. To know magnets stick to certain materials (metals) To know how to find an object which a magnet will stick to		To compare how things move on different surfaces I know how to notice that some forces need contact between two objects, but magnetic forces can act at a distance To 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 To describe magnets as having two poles To predict whether two magnets will attract or repel each other, depending on which poles are facing	To compare how things move on different surfaces To notice that some forces need contact between two objects, but magnetic forces can act at a distance To 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 To describe magnets as having two poles		To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object To identify the effects of air resistance, water resistance and friction, that act between moving surfaces To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird To describe the life process of reproduction in some plants and animals	

Earth & Space						To describe the movement of the Earth, and other planets, relative to the Sun in the solar system To describe the movement of the Moon relative to the Earth To describe the Sun, Earth and Moon as approximately spherical bodies To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky To know that the Sun is a star at the centre of our solar system and that it has eight planets To know that a moon is a celestial body that orbits a planet	
Working scientifically		To ask simple questions. To carry out simple tests using non-standard measurements when appropriate. To observe closely. To gather and record simple data. To sort objects and living things into groups based on simple properties. To explain what they found out to an adult or a partner.	To ask simple questions and recognise that they can be answered in different ways. To observe closely, using simple equipment. To perform simple tests using standard units when appropriate. To gather and record data to help in answering questions. To identify and classify. To talk about what they have found out and how they found it out.	To ask questions and understand there are different enquiry types they could use to answer them. To make relevant predictions. To identify what they will change, observe and keep the same. With support, set up simple practical enquiries. To make careful observations using scientific equipment. To perform tests and simple experiments and take measurements using standard units. To record findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables. To report on findings from enquiries, including oral and written explanations.	To ask relevant questions and use different types of scientific enquiry to answer them. To make predictions based on simple scientific knowledge. To identify what they will change, observe or measure and keep the same. To set up simple practical enquiries, comparative and fair tests. To make systematic and careful observations using scientific equipment. To take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. To gather, record and classify data in a variety of ways to help in answering questions. To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. To report on findings from enquiries, including oral and written explanations, displays or	To ask scientific questions and begin to understand which questions would be best suited to each enquiry type. To make predictions based on scientific knowledge. With support, plan different types of scientific enquiry. Where appropriate, to identify the dependent, independent and controlled variables. To use a range of scientific equipment to make systematic and careful observations. To take accurate measurements using a range of scientific equipment. To start to take repeat readings when appropriate. To record data using scientific diagrams and labels, classification keys, tables, bar and line graphs. To report and present findings from enquiries, including conclusions and begin to identify causal relationships in oral and written forms such as displays and other presentations.	To ask relevant scientific questions and choose which enquiry type would be best suited to answer them. To make predictions based on scientific knowledge. To plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. To use a range of scientific equipment to make systematic and careful observations with increased complexity. To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. To report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.

					presentations of results and conclusions.		
Famous scientists		Alexander Graham Bell David Attenborough	Pupils might find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam.	David Attenborough Charles Darwin Mary Anning Thomas Edison Sir Issac Newton	Linneus Steve Irwin Charles Francis Richter Thomas Edison William Beaumont Da Vinci	They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall 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. 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 find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	Pupils might find out about the significance of the work of scientists such as Carolus Linnaeus, a pioneer of classification 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.
Programme of study	Children follow the development matters curriculum	• What makes up a human body? • How are materials different? • What do plants need to grow? • How can we group animals? • How can we group plants? • Seasonal changes	• What do animals need to survive? • What do humans need to be healthy? • What can some materials be used for? • How do we successfully grow plants? • What is a habitat? • How do animals produce offspring?	• Which type of skeleton does a human have and how does it move? • How is Earth structured? • What is the structure of soil and how are rocks formed? • How does light affect our lives? • What do plants need to survive? • What forces affect our lives?	• How do we classify? • What can impact on a habitat? • How do we hear? • What uses electricity? • How does matter make up our planet? • Where does digestion start and end?	• How do we see forces in action? • What lies beyond Earth? • How can you best preserve a packed lunch? • How can we be inventors? • How do life cycles differ? • How do human bodies change in a lifetime?	• What is classification? • How do an animal's living systems work together to maintain a healthy body? • How does light enable us to see? • How have scientists used research to understand evolution? • How do you make an electrical circuit?
Useful resources							

- https://www.stem.org.uk/resources
- White Rose science
- Explorify
- Stem.org.uk

Implementation

- Science will be delivered through a discreet subject approach.
- Science is taught weekly throughout the year as a core subject.
- Children will build on prior learning to help them get an increasing understanding of the three disciplines of biology, chemistry and physics.
- Children will follow a consistent investigative process throughout their school life to develop their working scientifically skills.
- When working scientifically children may focus on different elements in different units from: prediction, method, collating results, drawing conclusions from results and evaluating the investigative process.
- Each lesson will start with a recap of prior learning or prior knowledge for a new topic.
- Learning will be well sequenced and progressive. These will be shared with children in their sticky learning.
- Children will get opportunities to ask lots of questions to help develop their curiosity about the world.
- They will be encouraged to be curious about the world, critical thinkers and discuss their findings.
- Regular Can you still? activities will help children to retrieve and remember their prior learning.
- Vocabulary will be used in knowledge organiser for reference and all new vocabulary is introduced and explained.
- Where possible learning will take place outside the classroom to experience the natural world (for example: seasonal changes in year 1).