



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Curriculum Intent for Science

At Brown's Church of England Primary School, our children are **SCIENTISTS!**

Our **intent** is to give every child a broad and balanced Science curriculum which enables them to confidently explore and discover what is around them, so that they have a deeper understanding of the world we live in.

We want our children to love science. We want them to have no limits to what their ambitions are and grow up wanting to be astronauts, forensic scientists, toxicologists or microbiologists. We want our children to remember their science lessons in our school, to cherish these memories and embrace the scientific opportunities they are presented with!

To achieve this, it involves exciting, practical hands-on experiences that encourage curiosity and questioning. Our aim is that these stimulating and challenging experiences help every child secure and extend their scientific knowledge and vocabulary, as well as promoting a love and thirst for learning.

At Brown's C of E Primary School, we have a coherently planned and sequenced curriculum which has been carefully designed and developed with the need of every child at the centre of what we do. We want to equip our children with not only the minimum statutory requirements of the science National Curriculum but to prepare them for the opportunities, responsibilities, and experiences of later life. This begins in the Early Years Foundation Stage Curriculum supports children's understanding of science through the planning and teaching of 'Understanding the World.' In the learning environment children find out about objects, materials and living things using all of their senses looking at similarities, differences, patterns and change. Both the environment and skilled practitioners foster curiosity and encourage explorative play, children are motivated to ask questions about why things happen and how things work.



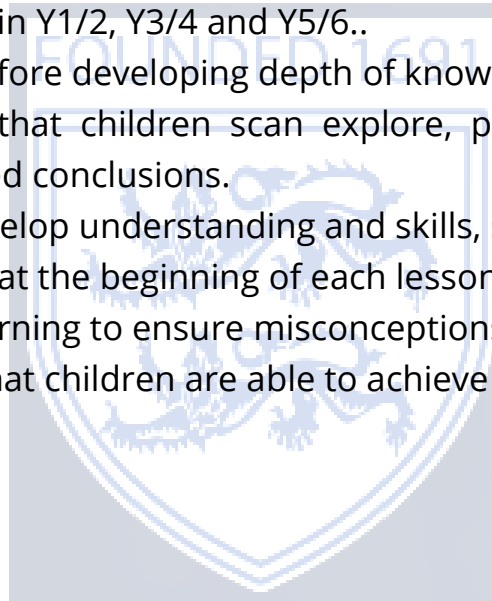
Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

All of our children are encouraged to use their natural environment around them to explore. Children enjoy spending time outdoors, both in the Early Years environment and our fantastic Forest School exploring mini-beasts and their habitats, observing the changing seasons, plants and animals.

Implementation

- Science topics are taught in a 2 year cycle in Y1/2, Y3/4 and Y5/6..
- Topics will build upon prior learning therefore developing depth of knowledge, understand and progression of skills.
- The Science curriculum is designed so that children can explore, predict, plan, carry out investigations and make observations as well as make well informed conclusions.
- Topics are blocked to enable pupils to develop understanding and skills, studying each topic in depth.
- Children will retrieve previous knowledge at the beginning of each lesson.
- Teachers will use assessment tools for learning to ensure misconceptions are highlighted and addressed.
- Effective modelling by teachers ensures that children are able to achieve their learning.



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS F2	What makes me me? Facial features, body parts- brain, lungs, heart. How do humans grow?	Understand the effect of seasons on the natural world.	Use the senses to they are important process and changes that happen (heating, freezing, melting)	Talk about different forces they can feel.	Plant seeds and care for growing plants.	Animals and their young. Understand the key features of the life cycle of a plant and animal.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

		What do some animals do in Autumn?	The 5 senses	What makes a shadow? Explore light through materials.	Understand the key features of the life cycle of a plant and an animal. Seasons of summer	
Why this and why now?						
	Builds on prior learning in pre-school and understanding of themselves and what their body can do. Links to the start of a new year exploring how we are all different but all human	Seasonal time of year. Links to hibernation and what animals do during different seasons.	Links to seasonal time of the year with ice and snow. Builds on prior learning in pre-school around baking and how ingredients change. Builds on learning from the start of the year about our body parts and what specific body parts do.	Seasonal time of the year. Children explore sunlight and how to make shade and shadows.	Seasonal time of the year. Builds on prior learning in pre-school understanding how to plant and look after seeds. We observe frog life cycle and visit rand farm park.	Builds on understanding of the life cycle of a frog. We know birds, amphibians and reptiles lay eggs. Look at mammals including: kittens and puppies .
Vocabulary and substantive key concepts						
	Animals including humans- head, nose, ear, shoulder, arm, elbow, wrist, hand, back, chest, hip, leg, knee, ankle, foot, sight, smell, taste, touch	Seasons- season, spring, summer, winter, month, year, day, night, weather, cold, hot, warm, hibernate, nocturnal	Changing materials, heating, freezing, melting, changing shape	Light and shadows- light, dark, shadow, change, shape, bright, dull, big, small	Animals including humans vocab. Plants- trees plants flowers, vegetables, fruit, grow, water, change	

Science Curriculum Cycle A

Y1/2 Focus	Why this, why now?	Lower KS2 Focus	Why this, why now?	Upper KS2 Focus	Why this, why now?
Term 1: Seasonal changes (Autumn)	The seasons are an important part of every child's life. We break down the 4 seasons focusing on spring and summer to allow the children to go into more detail understanding the key elements of spring and	Term 1: Electricity	Children begin learning about electricity in KS2. Within this topic they are exposed to being able to create simple circuits with wires and cells. They are given an understanding of the current and how this can be stopped or continued by using conductors and insulators. Children work on testing different circuits This prepares the	Term 1: Earth and Space	Children will develop their understanding of the universe. They will gain knowledge about why we have night and day, the seasons and how we orbit the sun. Through this topic, children will gain an understanding of the universe around them, including knowing all the planets



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Animals including humans	summer including temperature, weather patterns and day lengths. This begins the seasonal journey over the year, children can begin learning about what trees looks like now and daylight hours/ weather. We want children 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. This comes in the first term when children begin looking at their own bodies building up knowledge for later in the year		children for year 5 and 6 where they use knowledge of different circuits to turn lamps or buzzers on and off as well as recognising when different types of circuit need to be used.		and also the scale of the distance from the sun. This last area will help link forwards to our topic of forces in the following term thinking about the role that gravity plays in the Earth orbiting the sun.
Term 2: (Seasonal changes Winter)	Observe and describe weather associated with the seasons and how day length varies. This builds on the autumn term weather and child talk about seasonal differences. We want children to identify and name a variety of common animals including fish,	Term 2: Forces and magnets	Children are introduced to forces within lower KS2. We focus largely on understanding the role of magnets and whether objects are magnetic or not. This builds on the properties of materials work done in KS1 but extends their knowledge. This understanding of forces acting on objects will lead forward to the year 5/6 topic when the children delve deeper into different forces.	Term 2: Forces	This understanding of how forces work will support their understanding within this topic. This will look at forces including: air resistance, water resistance, friction, gravity, centripetal force and thrust. We will look at different forces acting upon us as we move as well as looking at how forces work both in the air and in water. Our forces topic builds on children's learning from year 3/4. Within this, children learn about the impact of magnets and the way they push or pull one another. Children will be aware of



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Animals including humans	amphibians, reptiles, birds and mammals. This builds on their EFYS knowledge and prepares them for Y2 learning about life cycles				how they push or pull one another and the poles that they have.
Term 3: Everyday materials	We want children to be able to distinguish between an object and the material from which it is made. It is important that children identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Children will be able to describe the simple physical properties of a variety of everyday materials. This learning allows for further scientific enquiry in term 6.	Term 3: Animals including humans-food chains, predator and prey	Children will learn about understanding of the roles of predators, prey and producers that they can use for this topic. Within this term, their learning is extended by the children being able to draw their own food chains. They will think about what animals belong in the chain whilst also thinking about what would happen should a part of the chain be missing. Children are taught this now to develop their learning of food chains from KS1. Children will understand that animals get their food from other plants or animals and that this is called a food chain.	Term 3: Animals including humans-lifestyle	We will be developing the children's learning by looking at exercise and the impact this has on the body. Delving deeper into looking at heart rates, we will analyse how drugs, alcohol and smoking can be harmful towards us. This topic builds on the work done in year 3/4 on healthy eating. In this topic children worked on being able to recognise the different food groups and what each group does to support our body. Children will be aware of the food groups and the importance of maintaining a healthy balanced diet.
Term 4: Seasonal changes (Spring)	Observe and describe weather associated with the seasons and how day length varies. This will allow children to build on previous 2 seasonal changes and notice the growth of new life. Identify and name a variety of common animals that are	Term 4: Animals including humans-key features of different animals	We will think about how the body works with a focus this term on the digestive system. We will also learn about teeth and the correct name for different teeth in our mouth. This term builds on the children's understanding of the human body from the learning in KS1. Within this they learnt about keeping our body safe and clean as well as understanding the different senses our body has.	Term 4: Properties and changes of materials	We will develop their learning on how states of matter can change and analyse reversible and irreversible changes, thinking about what they are and why they are this way. Children will have worked on how water changes state within year 3 and 4. They will understand the process of freezing and boiling and how the state of matter changes.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Animals including humans	carnivores, herbivores and omnivores. This will help children secure knowledge ready for Y2 discussing diets.				
Term 5: Plants	We feel it is vital children gain an understanding of the plants that they see around them.. evergreen, understanding the differences in the two. This helps prepare children for Y2 where they will look how plants and bulbs/seeds grow and what they need to grow and survive.	Term 5: Plants	This term will work on developing their understanding of what these parts do. Combining our knowledge together, children will gain an understanding of how the different parts of the plant support it's survival building on their KS1 work. Children have worked on understanding that plants need water, air and light to survive in KS1..	Term 5: Living things- classification	. Develop this further by identifying how we classify animals based on the similarities and differences of animals. Children will learn about classification systems including those looked at by Carl Linneaus. Build on knowledge gained from year 3 and 4 when the children worked on understanding animals who are vertebrates and invertebrates. Children will know what the differences are between these and be able to name different animals in these categories
Term 6: Seasonal changes (Summer)	Observe and describe weather associated with the seasons and how day length varies. This will complete the cycle of the seasons.	Term 6: Rocks, soils and fossils	Children become introduced to the topic of rocks in lower KS2. They start to think about the 3 main types of rock and the differing properties of them. This links the children into work on fossils and thinking about soil. We start to look at the different types of soil that we might have and where they might be found. Looking at our local environment we think about the soil we have. We can make links back to our work on plants and why they might be more suited to different soils based on what they need to survive.	Term 6: Living things and their habitats- life cycles and reproduction	This will continue to develop our understanding of life cycles. Children at this age begin to learn about reproduction, making links to our PSHE work. They will identify how animals and plants differ in their reproduction and become introduced to vocabulary including asexual and sexual. Having looked at human life cycles in cycle B, the children will identify the similarities between mammals and other animals. Children will be aware of how animals are grouped into mammals, birds, amphibians, reptiles and birds from their LKS2 work.
Everyday materials	Children will compare and group together a variety of everyday materials on the basis of their simple physical properties. This will build on the children's previous knowledge from the year to allow scientific enquiry				



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Science Curriculum Cycle B

Y1/2 Focus	Why this, why now?	Lower KS2 Focus	Why this, why now?	Upper KS2 Focus	Why this, why now?
Term 1: Seasonal changes (Autumn)	The seasons are an important part of every child's life. We break down the 4 seasons focusing on spring and summer to allow the children to go into more detail understanding the key elements of spring and summer including temperature, weather patterns and day lengths. This begins the seasonal journey over the year, children can begin learning about what trees look like now and daylight hours/ weather.	Term 1: Light	Light in year 3/4 looks at introducing the children to the concept of light travelling in straight lines. Children will work on experiments thinking about how they can use reflection to see round corners. We will also look at shadows throughout the day and how the length changes dependent on where the sun is in the sky. This will link back to KS1 work on seasons where they thought about the differing lengths of days dependent on the season..	Term 1: Properties and changes of materials	Within year 5/6 we develop their understanding these purposes by delving into more complex ideas such as solubility, transparency and thermal and electrical conductivity. Children will be able to draw back on previous experiences of this topic to give reasons and evidence for the answers that they decide on. This topic has developed throughout the journey of the children through school. They already recognise the properties of materials and how they are linked to different purposes.
Everyday materials	Children learn about everyday materials at the start of their year. It helps them to become more aware of the materials that they come across with in their every day life but become				



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	more inquisitive about their uses. This builds upon their knowledge from Y1 and prepares them to LKS2 learning in rocks and soils and states of matter.				
Term 2: (Seasonal changes Winter) Animals including humans	Observe and describe weather associated with the seasons and how day length varies. This builds on the autumn term weather and child talk about seasonal differences. Children will notice that animals, including humans, have offspring which grow into adults. They will find out about and describe the basic needs of animals, including humans, for survival (water, food and air) and be able to describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. This builds upon the knowledge learnt in Y1 and prepares them to delve further into animals including humans in LKS2.	Term 2: Animals including humans- the human body	Within this topic their learning will be extended thinking about the role the skeleton plays in keeping us safe. We will examine the 3 main reasons we have a skeleton, learning what would happen without one. This topic will link on from the work done in KS1 on the human body. Children will be familiar with the skeleton, knowing different parts of the body including some of the main bones.	Term 2: Animals including humans- circulation	Knowing the roles of the different organs (that have been learnt in their science journey) helps the children recognise how blood is moved around our body. We look at how maintaining a healthy diet supports our circulation system and what happens within our body if this isn't maintained. Within year 6 children are aware of the health benefits and the importance of this. In lower KS2 we looked closely at the digestive system and the role it plays in supporting our body. Within upper KS2 the focus shifts to the circulation system.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Term 3: Living things and their habitat	We want children to explore and compare the differences between things that are living, dead, and things that have never been alive. They will also 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. <i>This builds upon Year 1 learning but also prepares them for LKS2 animals including humans and living things and their habitats.</i>	Term 3: Animals including humans- being healthy	we begin to delve deeper into how to keep our body healthy. Children begin to learn about a healthy, balanced diet and the importance of this. We start to talk about the different food groups and how animals get the nutrition they need from these. Children will learn about the impact of not having a balanced diet and how they can prevent this from happening. <i>Developing on from last term where we looked at the role of the skeleton in protecting us,</i>	Term 3: Electricity	This term will look to extend their understanding of circuits, thinking about how they can be constructed in different ways. Children will work on how they compare circuits thinking about which is best to be used in different situations <i>This is taught to develop children's understanding from lower KS2. In year 3/4 the children learnt to construct simple circuits and understand how current moves.</i>
Term 4: Seasonal changes (Spring)	Observe and describe weather associated with the seasons and how day length varies. <i>This will allow children to build on previous 2 seasonal changes and notice the growth of new life.</i>	Term 4: Living things and their habitats	We look further afield by analysing different habitats around the world comparing them to our local environment. We look at how we classify these different animals and make links to the habitats that we live in. <i>Building on from our KS1 work we start to delve deeper into habitats.</i>	Term 4: Animals including humans- changes growth and development	This topic seeks to build on that by looking at the changes that take place as we get older We look at the life cycle of a human and how different parts of our lives cause changes. As we are in year 5/6 we make links to our PSHE work by thinking about puberty and supporting the children in gaining a deeper understanding of what happens for both boys and girls during this period. <i>This builds on our work from LKS2 when we became familiar with our skeleton and the role it plays in supporting us. Alongside this, children will have also worked on understanding of the digestive and circulation system.</i>
Living things and their habitats	Children will identify and name a variety of plants and animals in their habitats, including microhabitats. Children will also identify that most living things live in habitats to which they				



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	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. This will build upon previous knowledge and prepare the children to look at living things and their habitats in LKS2				
Term 5: Plants	Children are surrounded by plants, particularly being in a small village like ours. We want children 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. This builds upon Y1 knowledge and prepares children's further learning of plants in LKS2	Term 5: Sound	Following a similar structure, we look at how we hear things through vibrations and how different parts of the ear support our hearing. Building on our understanding of light from earlier in the year, we look at the topic of sound.	Term 5: Light	Developing this, we begin to delve deeper into how light travels into our eyes. Added to this the children, look at the ways in which some objects let no, little or all the light through. Our light topic develops learning from lower KS2 in which they learnt about natural and man made light sources. Children will already know that light travels in straight lines.
Term 6: Seasonal changes (Summer) Use of everyday materials	Observe and describe weather associated with the seasons and how day length varies. This will complete the cycle of the seasons. Children will find out how the shapes of solid objects made from some materials can be	Term 6: States of matter	Children will look at the 3 different states of matter and the properties that make these. Moving their learning forward, we look at how we might move from one state of matter to another through condensation and evaporation. It adds to the children's work in KS1 at looking at the properties of different materials. Children will be aware of how materials are used for different purposes and make selections based on their properties.	Term 6: Evolution and inheritance	In the final part of the year children learn about the way in which humans have changed over time. Using Darwin's theory of evolution we begin to recognise how humans have adapted and changed over time. We look at comparing inherited and environmental characteristics. It will build on knowledge gained in year 3/4 when the children worked on



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	changed by squashing, bending, twisting and stretching. This helps children build from term 1 learning and begin to work scientifically in their thinking.				understanding how animals adapt to their habitats.
--	---	--	--	--	--

Essential Knowledge in the Year One Science Curriculum – Cycle A

Term	National Curriculum Expectations	Substantive Knowledge	Learning Questions	Key Vocabulary	Working Scientifically
Autumn Term 1 Seasonal changes (For terms 2, 4, 6 also)	- Observe changes across the four seasons. - Observe and describe weather associated with the seasons and how day length varies.	- I know that we have 4 main seasons. - I can describe where these seasons come in our year. - I know that the days are longer in Spring and summer. - I know that in Summer the temperature increases. - I know that in Summer it can still rain even though it is warm. - I can name the different types of weather we see in Spring and Summer. - I know that my body is made up of a skeleton.	- What are the seasons? - How do we describe weather? - What is Spring and Summer like? - How do the days change in Summer compared to Winter?	Summer, Spring, Autumn, Winter, sun, day, moon, night, light, dark.	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.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Animals including humans	identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	- I recognise that all part of my skeleton are made up from bones. - I can name different body parts linked to my head including: eyes, ears, nose, mouth. - I know which sense each of those body parts are associated with. - I know different parts of arms including elbow, wrists and hands. - I can talk about different parts of my legs including knees, ankles and feet. - I know I can use my senses through different parts of my body	- What does my skeleton look like? - How are the senses linked to my body? - Which of my body parts are linked to the different senses? - What different parts of my body make up my arms and legs? - How can I create rhymes to help me remember different bod parts?	Skeleton, arm, leg, head, elbow, knee, ear, eye, nose, mouth, foot, wrist, ankle	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.
Autumn Term 2 Animals including humans	- identify and name a variety of common animals including, fish, amphibians, reptiles, birds and mammals, - describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and	- I can name different fish including goldfish. - I can name different mammals including: cats, dogs, rabbits, hamsters. - I can name reptiles including tortoises and snakes. - I can name different birds including parrots, robins and pigeons.	- What different type of animals can we keep as pets? - How do different animals compare with each other? - Do all animals need the same things to survive? - What different habitats in our local area might you find these animals in? - Why are some animals better suited to being pets than others?	Fish, reptiles, mammals, birds, amphibians (and examples of each type of animal), leg, arm, elbow, head, ear, nose, back, wings, beak	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 some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	mammals including pets)	- I can name different amphibians including frogs and toads. - I know how to compare different types of animals. - I know the different habitats that these animals might live in. - I know how people can keep these animals as pets	Which animals would be the hardest to keep as pets?		
Spring Term 1 Every day materials	- distinguish between an object and the material from which it is made - identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock - describe the simple physical properties of a variety of everyday materials	- I know what is meant by the term man made. - I know man made materials we have in school. - I know how to show the difference between a natural and man made material. - I know what is meant by the term natural. - I can name things that are made of glass, wood, plastic, metal and rock. - I know how to describe characteristics of different materials.	- What is the difference between a natural and man-made material? - What man made objects do we see around school? - What different materials do I see and use in school? - Why are different objects made of different materials? - Why do some objects have to be man made?	Wood, plastic, glass, paper, water, metal, rock, hard, soft, bendy, rough, smooth.	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.
Spring Term 2	identify and name a variety of common animals that are carnivores,	- I know what is meant by the term herbivore, carnivore and omnivore - I understand what diet these animals would have	- How do we take care of different animals as pets? - What diet would this animal have?	herbivore, carnivore, omnivore,.	Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Animals including humans	herbivores and omnivores	I can group animals based on these terms			they identify and group them; grouping animals according to what they eat.
Summer Term 1 Plants	- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees - Identify and describe the basic structure of a variety of common flowering plants, including plants.	- I know the name of trees in the local environment - I know the difference between evergreen and deciduous trees - I can name the basic parts of a tree - I can name the basic parts of a flower. - I know what flowers we have in school. - I know what trees we have in school.	- What are the names of these trees? - How do I know if a tree is evergreen? - What is the name of each part of a tree? - What is the name of parts of a flower? - What flowers and trees can we see in school?	Leaves, flowers, stem, blossom, petals, fruit, roots, bulb, seed, trunk, branches	Pupils might work scientifically by observing closely, using magnifying glasses, and comparing and contrasting familiar plants; describing how they are able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Pupils might keep a record of how plants have changed over time.
Summer Term 2 Everyday materials	- 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	- I know how to describe characteristics of different materials. - I can name different materials. - I can talk about materials that I use. - I can test different materials for a purpose. - I can say which material would best suit different needs.	- What materials would be best suited for different objects? - What materials do I use in my life? - When do I use different materials in the classroom? - What would happen if we changed the materials of different objects?	Wood, plastic, glass, paper, water, metal, rock, hard, soft, bendy, rough, smooth.	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?'



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Essential Knowledge in the Year Two Science Curriculum – Cycle A

Term	National Curriculum Expectations	Substantive Knowledge	Learning Questions	Key Vocabulary	Working Scientifically
Autumn Term 1 Everyday materials	identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses	- I know the names of different materials including: wood, plastic, metal, glass, brick, rock, paper and cardboard. - I can name items that are made out of all of the above. - I know that materials can be used for more than one purpose. - I know that different materials have different properties. - I know that materials have a specific purpose. - I know how changing materials will impact it's use. - I know what materials we have in school. - I know what materials I use on an everyday basis.	- What different materials do we have in the classroom? - Why are certain materials better suited for different objects? - What are the different properties of materials outside? - What items in school are made out of wood, plastic, metal, glass, brick, rock, paper and cardboard? - What would happen if we changed these materials?	Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, waterproof, absorbent, opaque, transparent, brick, paper, fabrics, squashing, bending, twisting, stretching, elastic, foil.	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 areas, and recording their observations.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Autumn Term 2 Everyday materials	- compare how things move on different surfaces. - find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	- I know that the properties of a material make it best suited for a particular job. - I know how to explain what material I would use for an object based on it's properties. - I know that some materials are mouldable through squashing, bending, twisting or stretching. - I know that some materials are not flexible. - I know that the shape of an object can help it move across a surface.	- How does the shape of an object impact it's ability to move across a surface? - Why is it important some materials are mouldable and some aren't? - How can we change an object to make it move better on a surface? - Which materials are best used for moving across a surface? - How can I classify materials based on how they can be moulded?	Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, waterproof, absorbent, opaque, transparent, brick, paper, fabrics, squashing, bending, twisting, stretching, elastic, foil.	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 areas, and recording their observations.
Spring Term 1 Living things and their habitats	explore and compare the differences between things that are living, dead, and things that have never been alive	- I know that animals can obtain their food from other animals or plants. - I know this this is called a food chain. - I know why animals need food.	- How can we make a simple food chain based on animals we are familiar with? - How is a food chain constructed? - Where do different animals fit in a food chain?	energy, food chain, predator, prey,	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.



	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.	- I know that without food animals will not survive. - I know what role different animals might play within a food chain. - I know which way energy travels in a food chain.	- Can animals be in different positions on a food chain? - What are the differences between dead, alive and never alive?		Pupils might work scientifically by: sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. They should describe how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. They could construct a simple food chain that includes humans (e.g. grass, cow, human).
Spring Term 2 Animals including humans	- find out about and describe the basic needs of animals, including humans, for survival (water, food and air) - describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. - identify, name, draw and label the basic parts of the human body and say which part of the body is	- I know that animals need water, air and food to survive. - I know that we have 5 senses: touch, taste, smell, sight and hearing. - I know which part of my body I use for these 5 senses. - I know that it is important to keep myself clean. - I know that exercise helps me stay healthy. - I know how to label a human body correctly. - I can describe changes of an adult compared to a child.	- What do animals need to survive? - What are the 5 senses? - Which parts of my body are used for the different senses? - Why do I need to keep my body clean? - How does exercise help me to stay healthy? - Which parts of my own body can I recognise? - What changes can you see between older and younger people?	Human, senses, hearing, sight, smell, taste, touch, survival, water, food, air, exercise, hygiene, ear, eye, mouth, hand.	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 processes 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



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	associated with each sense				
Summer Term 1 Plants	- observe and describe how seeds and bulbs grow into mature plants - find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	- I know that plants have a life cycle. - I know that plants start out as bulbs or seeds. - I know that we have to take care of plants in order for them to grow. - I know that plants need water, light and heat to survive. - I know why plants grow better in spring and summer than in winter. - I know that plants change and grow over time.	- I know that plants have a life cycle. - I know that plants start out as bulbs or seeds. - I know that we have to take care of plants in order for them to grow. - I know that plants need water, light and heat to survive. - I know why plants grow better in spring and summer than in winter. - I know that plants change and grow over time.	Seeds, bulbs, water, light, temperature, growth.	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 to the processes 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.
Summer Term 2 Living things and their habitats	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	- I know that different animals are suited to different habitats. - I know a microhabitat is a very small habitat where minibeasts live. - I know some habitats are very large like oceans, forests, woodlands and rivers.	- What is a habitat? - What different types of habitats do different animals live in? - Are all habitats large places for animals to survive in? - How do different animals source their food? - Could animals survive in different habitats?	Living, dead, habitat, micro-habitat, woodland, pond, desert.	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



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats	I know some habitats are very small such as under logs or rocks.		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 can work scientifically as They could describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there.
--	--	--	--	---

Essential Knowledge in the Lower Key Stage Two Science Curriculum – Cycle A

Term	National Curriculum Expectations	Substantive Knowledge	Learning Questions	Key Vocabulary	Working Scientifically
Autumn Term 1	- 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	- I know that electricity runs in a circuit. - I know the circuit has to be complete in order for a component to light. - I can name different parts of a circuit including: wires, bulbs, cells, switches and buzzers.	- How do I construct a simple circuit? - What happens if the circuit is not complete? - What components do I need to make a circuit? - Why is it important to have conductors and insulators to keep us safe?	Cells, wires, bulbs, switches, buzzers, battery, circuit, series, conductors, insulators.	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



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	- 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.	- I know that a battery/cell has a positive and negative side. - I know how to construct a simple circuit using different components. - I know that conductors let heat and electricity through them. - I know insulators do not let electricity through them. - I can name different materials that are conductors or insulators. - I know how to use a switch to turn a circuit on or off. - I know how to make bulb brighter within a circuit.	- How can I alter a circuit to change the brightness of a bulb? - How can I experiment with different components to turn a bulb on or off?		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.
Autumn Term 2	- compare how things move on different surfaces - notice that some forces need contact between two objects, but magnetic forces can act at a distance - observe how magnets attract or repel each other and attract some materials and not others	- I know that a magnet has two poles called north and south. - I know that a north and south pole will attract whilst a south-south or north-north will repel. - I know the names of different types of magnet including: bar, ring, button and horseshoe. - I can recognise different materials that will be attracted to magnets.	- What are magnets? - Why do magnets repel or attract each other? - Do magnets have to be touching an object for the force to act upon it? - Which materials will be magnetic? - Does a larger magnet always have a stronger force? - How can I classify different materials based on their magnetism?	Magnetic, force, contact, attract, repel, friction, poles, push, pull.	Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe). Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find



	- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials - describe magnets as having two poles - predict whether two magnets will attract or repel each other, depending on which poles are facing.	- I know how to categorise materials based on whether they are magnetic. - I know how different magnets have different strengths. - I know how to keep an experiment fair controlling the variables.			answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.
Spring Term 1	- Construct and interpret a variety of food chains. - Identify producers, predators and prey	- I know that producers start a food chain. - I know that producers produce their own food. - I know that predators eat other animals. - I know that when an animal is eaten by another it is known as prey. - I know that energy is being transferred through the food chain. - I know when drawing a food chain the arrow points in the direction that the energy is moving.	- What is a food chain? - What are the different stages of a food chain? - What would happen if a piece of the food chain was taken out? - How is energy transferred through the chain? - What roles do producers, consumers, prey and predators play in a food chain? - Can the same animal play a different role in a different food chain?	Food chain, producer, consumer, predator, prey, herbivore, carnivore, omnivore.	Pupils look at a range of common plants and animals. They learn about what producers, consumers, prey and predators are. They construct a number of simple food chains.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

		I know that all parts of the food chain are needed and cannot have a piece missing.			
Spring Term 2	- 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	- I know that the digestive system helps give us energy to survive. - I know the different stages of the digestive system. - I know how to label the key parts of my body involved in the digestive system. - I can label the different teeth that I have using the correct names: canines, molars and incisors. - I know the roles of the different types of teeth in my mouth. - I know that different animals have different teeth. - I know the difference between teeth in a carnivore to that of a herbivore.	- How does the digestive system help our body? - What key parts of our body are involved in the digestive system? - What role do my teeth play in the digestive system? - How can I identify the different types of teeth and their role? - Why is it important to keep my teeth healthy? - Do all animals have the same types of teeth?	Mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine, herbivore, carnivore, canine, incisor, molar.	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 to understand their special functions. Pupils might work scientifically by: comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.
Summer Term 1	identify and describe the functions of different parts of flowering plants: roots,	I know that flowering plants have: roots, stem/trunk leaves and flowers and the role they	- What are the key parts of a plant? - What roles do the different parts of a plant play in keeping it alive?	Air, light, water, nutrients, soil, reproduction, transportation,	Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and



	stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	play in supporting the plant. • I know where plants obtain the different things they need to survive. • I know the impact of taking away one of the things plants need to survive. • I know that water is moved through plants using transportation. • I know the plants reproduce for themselves using seed dispersal. • I know that pollination involves pollen being taken to the female part of the plant to help create seeds. • I know that germination is the growth of a seed into a plant.	• What do plants need to survive? • How do plants stay hydrated? • How do plants reproduce for themselves? • How can the environment prevent plants from reproducing?	dispersal, pollination, flower, germination.	stem in nutrition and support, leaves for nutrition and flowers for reproduction. Note: Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens. Pupils might work scientifically by: comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.
Summer Term 2	• compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock	• I know the names of the 3 different types of rock: metamorphic, sedimentary and igneous. • I know the different characteristics of these rocks. • I know that fossils are formed when is buried under rock.	• What are the characteristics of the 3 main types of rock? • How are fossils formed? • What is soil made from? • How are the types of soil different from one another? • What are the different types of soil good for?	Fossils, soils, sandstone, granite, marble, pumice, crystals, absorbent	Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment. Pupils might work scientifically by: observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	recognise that soils are made from rocks and organic matter.	- I know that fossils are formed over great lengths of time. - I know that soils are made from rocks or organic matter such as dead plants, animals and water. - I know there are different types of soil including: chalk soil, sandy soil, clay soil and peat. - I know how to compare the qualities of different soil types.	What happens when we try to alter the make up of the different soils?		they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. They can raise and answer questions about the way soils are formed.
--	--	---	---	--	---

Essential Knowledge in the Upper Key Stage Two Science Curriculum – Cycle A

Term	National Curriculum Expectations	Substantive Knowledge	Learning Questions	Key Vocabulary	Working Scientifically
Autumn Term 1	- 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	- I know the 8 planets of the solar system. - I recognise that the Earth orbits the sun and it takes 365 $\frac{1}{4}$ days. - I know why we have a leap year. - I know that the moon orbits the Earth taking 27 days. - I know that the Earth spins on it's axis creating day and night.	- How can we remember the name of the planets? - How does the distance of the planets from the sun change? - What causes planets to orbit the sun?	Earth, sun, moon, axis, rotation, day, night, phases of the moon, star, constellation	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



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	- describe the Sun, Earth and Moon as approximately spherical bodies - use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	- I know that the Earth is tilted causing the seasons. - I know the Earth orbits the sun because of the sun's gravitational pull and the Earth's natural sideways movement. - I know that the scale of distance between the planets becomes greater the further away from the sun they are. - I know that the length of my shadow will change throughout the day because of the sun's position in the sky. - I know the different phases of the moon. - I know the difference between the heliocentric and geocentric model of the solar system.	- Why do we have night and day? - How could people tell the time before technology? - What are the different phases of the moon?		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
Autumn Term 2	- 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	- I know that gravity is always acting on us. - I know that gravity is a force pulling an object towards the centre of the Earth. - I know that force is measured in newtons. - I know that centripetal force acts on objects moving in a circular motion. - I know that air resistance works in the opposite direction to which an object is moving.	- What is centripetal force and how does it link to gravity? - Do heavier objects always fall faster than lighter objects? - How can I use air resistance in an experiment? - Does friction have more impact on	Air resistance, water resistance, friction, gravity, newton, gears, pulleys	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



	levers, pulleys and gears, allow a smaller force to have a greater effect.	- I understand that the greater the surface area the more air resistance there will be. - I know that friction prevents an object from moving across a surface. - I know that the smoother the surface the less friction there is. - I know that water resistance acts in the same way in water as air resistance in air. - I know there are 3 main types of lever and the differences between a first, second and third class lever. - I know how to move heavier objects using a lever. - I know how to record my results accurately in a table. - I know how to keep my experiments fair by controlling different variables.	different surfaces? - How can I keep a boat floating for the longest time? - When would I use the different types of lever?		out how scientists, for example, 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, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.
Spring Term 1	- Recognise the impact of having a healthy diet. - Understand the importance of a healthy lifestyle - Understand how our bodies function	- I know the names of the 5 main food groups. - I know different foods that belong to each of the food groups. - I know how to create a balanced meal. - I know how the food groups impact on my body. - I know that cardiovascular exercises help to strengthen the heart and pulse rate.	- How do we change as a human being? - How does our body work? - How can we keep ourselves healthy? - How can I create a healthy meal?	Animals, humans, nutrition, food, diet, grouping, healthy.	Pupils should continue to learn about the importance of nutrition. Pupils might work scientifically by: They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

		- I know how to measure my heart rate accurately. - I know the benefit of regularly increasing my heart rate. - I know that smoking causes less oxygen to be in my body. - I know how smoking can cause fatty deposits and poisons lungs. - I know that drugs can both be harmful and helpful to my body.	- What can cause our body be harmed? - Are all drugs dangerous to our body?		
Spring Term 2	- 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 - explain that some changes result in the formation of new materials, and that this	- I know that everything is made up of particles. - I know how particles are ordered differently in solids, liquids and gases. - I know that a reversible changes means I can get the original material back. - I know that an irreversible change means you cannot get the original material back. - I know that I can separate materials using filtering, sieving and evaporating. - I know that when a substance dissolves it is still there even though we can't see it. - I know that when two substance form together it is called a solution. - I know that new materials can be formed by mixing two substances together.	- What is the difference between a reversible and irreversible change? - Why are irreversible changes irreversible? - How are particles arranged in different materials? - What happens to substances when they dissolve? - How can I separate different materials? - How does the temperature of	Materials, properties, changes, solid, liquid, gas, dissolve, substance, solution, mixture, separated, reversible, irreversible, filter, sieve, evaporate,	Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. 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



	kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.		water change it's ability to dissolve different materials?		against them. Safety guidelines should be followed when burning materials. Pupils might work scientifically by: They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.
Summer Term 1	- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals - give reasons for classifying plants and animals based on specific characteristics.	- I know what micro-organisms are. - I know which animals are vertebrates and invertebrates. - I know who Carl Linnaeus was and what he was famous for. - I know what classification means. - I know what a classification web is. - I know how to classify people in my classroom. - I know how to apply classification questions to unfamiliar and familiar animals. - I know how to explain how a classification system works.	- What are micro-organisms? - Who was Carl Linnaeus? - How can I classify people in the classroom? - What classification grid could I make for animals I know? - How could I classify animals or plants that are unfamiliar to me?	Classification, vertebrates, invertebrates, micro-organisms, amphibians, reptiles, mammals, insects.	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 (such as 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 to identify some animals and plants in the immediate environment. They could



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

					research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.
Summer Term 2	- 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.	- I can describe the life cycle of a mammal. - I can describe the life cycle of an amphibian. - I can describe the life cycle of an insect - I can describe the life cycle of a bird. - I know how to describe the differences in life cycles of different animals. - I know the meaning of sexual and asexual reproduction. - I know how plants reproduce asexually. - I know that different animals and plants have different periods of time for reproduction.	- What is the life cycle of mammal? - How does the life cycle of a mammal differ to that of an amphibian, insect or bird? - How do plants reproduce? - How is industry impacting on the reproduction of plants and animals?	Mammal, reproduction, insect, amphibian, bird, offspring.	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 and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks),



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

					comparing how different animals reproduce and grow.
--	--	--	--	--	---

Essential Knowledge in the Year One Science Curriculum – Cycle B

Term	National Curriculum Expectations	Substantive Knowledge	Learning Questions	Key Vocabulary	Working Scientifically
Autumn Term 1 Seasonal changes (For terms 2, 4, 6 also)	- Observe changes across the four seasons. - Observe and describe weather associated with the seasons and how day length varies. - identify, name, draw and label the basic	- I know that we have 4 mains seasons. - I can describe where these seasons come in our year. - I know that the days are longer in Spring and summer. - I know that in Summer the temperature increases. - I know that in Summer it can still rain even though it is warm. - I can name the different types of weather we see in Spring and Summer. - I know that my body is made up of a skeleton.	- What are the seasons? - How do we describe weather? - What is Spring and Summer like? - How do the days change in Summer compared to Winter? - What does my skeleton look like?	Summer, Spring, Autumn, Winter, sun, day, moon, night, light, dark. Skeleton, arm, leg,	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. Pupils should have plenty of opportunities to learn the names of the



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Animals including humans	parts of the human body and say which part of the body is associated with each sense.	- I recognise that all part of my skeleton are made up from bones. - I can name different body parts linked to my head including: eyes, ears, nose, mouth. - I know which sense each of those body parts are associated with. - I know different parts of arms including elbow, wrists and hands. - I can talk about different parts of my legs including knees, ankles and feet. - I know I can use my senses through different parts of my body	- How are the senses linked to my body? - Which of my body parts are linked to the different senses? - What different parts of my body make up my arms and legs? - How can I create rhymes to help me remember different body parts?	head, elbow, knee, ear, eye, nose, mouth, foot, wrist, ankle	main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.
Autumn Term 2 Animals including humans	- identify and name a variety of common animals including, fish, amphibians, reptiles, birds and mammals, - describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and	- I can name different fish including goldfish. - I can name different mammals including: cats, dogs, rabbits, hamsters. - I can name reptiles including tortoises and snakes. - I can name different birds including parrots, robins and pigeons.	- What different type of animals can we keep as pets? - How do different animals compare with each other? - Do all animals need the same things to survive? - What different habitats in our local area might you find these animals in?	Fish, reptiles, mammals, birds, amphibians (and examples of each type of animal), leg, arm, elbow, head, ear, nose, back, wings, beak	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 some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	mammals including pets)	- I can name different amphibians including frogs and toads. - I know how to compare different types of animals. - I know the different habitats that these animals might live in. - I know how people can keep these animals as pets			
Spring Term 1 Every day materials	- distinguish between an object and the material from which it is made - identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock - describe the simple physical properties of a variety of everyday materials	- I know what is meant by the term man made. - I know what is meant by the term natural. - I can name things that are made of glass, wood, plastic, metal and rock. - I know how to describe characteristics of different materials. - I know why different materials are used for purposes.	- What is the difference between a natural and man-made material? - What different materials do I see and use in school? - Why are different objects made of different materials? - How can materials keep us safe? - What materials would I use for an activity?	Wood, plastic, glass, paper, water, metal, rock, hard, soft, bendy, rough, smooth.	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.
Spring Term 2 Animals including humans	identify and name a variety of common animals that are carnivores, herbivores and omnivores	- I know what is meant by the term herbivore, carnivore and omnivore - I understand what diet these animals would have - I can group animals based on these terms	- How do we take care of different animals as pets? - What diet would this animal have?	herbivore, carnivore, omnivore,.	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.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Summer Term 1 Plants	- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees - Identify and describe the basic structure of a variety of common flowering plants, including plants.	- I know the name of trees in the local environment - I know the difference between evergreen and deciduous trees - I can name the basic parts of a tree - I can name the basic parts of a flower	- What are the names of these trees? - How do I know if a tree is evergreen? - What is the name of each part of a tree? - What is the name of parts of a flower?	Leaves, flowers, stem, blossom, petals, fruit, roots, bulb, seed, trunk, branches	Pupils might work scientifically by observing closely, using magnifying glasses, and comparing and contrasting familiar plants; describing how they are able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Pupils might keep a record of how plants have changed over time.
Summer Term 2 Everyday materials	- 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	- I know how to describe characteristics of different materials. - I know materials in the classroom. - I can group the materials based on a given setting, e.g hard, smooth. - I know how to make suggestions for a material for a purpose. - I know materials that are similar to school and at home. - I can say which material would best suit different needs.	- What materials would be best suited for different objects? - What would happen if we changed the materials of different objects?	Wood, plastic, glass, paper, water, metal, rock, hard, soft, bendy, rough, smooth.	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?'

Essential Knowledge in the Year Two Science Curriculum – Cycle B



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Term	National Curriculum Expectations	Substantive Knowledge	Learning Questions	Key Vocabulary	Working Scientifically
Autumn Term 1 Everyday materials	identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses	- I know the names of different materials including: wood, plastic, metal, glass, brick, rock, paper and cardboard. - I can name items that are made out of all of the above. - I know that materials can be used for more than one purpose. - I know that different materials have different properties. - I know the impact of changing a material. - I know materials that I come into contact with each day.	- What materials can we name that we use in our lives? - What different materials do we have in the classroom? - What would happen if we swapped materials in the classroom? - Why are certain materials better suited for different objects? - What are the different properties of materials?	Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, waterproof, absorbent, opaque, transparent, brick, paper, fabrics, squashing, bending, twisting, stretching, elastic, foil.	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 areas, and recording their observations.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

Autumn Term 2 Animals including humans	• find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	• I know that animals need water, air and food to survive. • I know that we have 5 senses: touch, taste, smell, sight and hearing. • I know which part of my body I use for these 5 senses. • I know that it is important to keep myself clean. • I know that exercise helps me stay healthy. • I know how to label a human body correctly. • I can describe changes of an adult compared to a child.	• What do animals need to survive? • What are the 5 senses? • Which parts of my body are used for the different senses? • Why do I need to keep my body clean? • How does exercise help me to stay healthy? • Which parts of my own body can I recognise? • What changes can you see between older and younger people?	Human, senses, hearing, sight, smell, taste, touch, survival, water, food, air, exercise, hygiene, ear, eye, mouth, hand.	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 processes 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
Spring Term 1 Living things and their habitats	• explore and compare the differences between things that are living, dead, and things that have never been alive • describe how animals obtain their food from plants and other animals, using	• I know that animals can obtain their food from other animals or plants. • I know this is called a food chain. • I know how to present a food chain. • I know that arrows in a food chain show the direction of energy.	• How can we make a simple food chain based on animals we are familiar with? • How is a food chain constructed? • Where do different animals fit in a food chain? • Can animals be in different positions on a food chain?	energy, food chain, predator, prey,	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 might work scientifically by: sorting and classifying things according to whether they are living, dead or were



	the idea of a simple food chain, and identify and name different sources of food.	- I know where to place animals in a food chain. - I know different food sources for different animals.	What are the differences between dead, alive and never alive?		never alive, and recording their findings using charts. They should describe how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. They could construct a simple food chain that includes humans (e.g. grass, cow, human).
Spring Term 2 Living things and their habitats	- identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other - identify and name a variety of plants and animals in their habitats, including microhabitats	- I know what a habitat is. - I know different types of habitat. - I know that different animals need different things to survive. - I know that different animals are suited to different habitats. - I know a microhabitat is a very small habitat where minibeasts live. - I know some habitats are very large like oceans, forests, woodlands and rivers. - I know some habitats are very small such as under logs or rocks.	- What is a habitat? - What different types of habitats do different animals live in? - Are all habitats large places for animals to survive in? - How do different animals source their food? - Could animals survive in different habitats?	Living, dead, habitat, micro-habitat, woodland, pond, desert.	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 can work scientifically as They could describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find



					out how the conditions affect the number and type(s) of plants and animals that live there.
Summer Term 1 Plants	- observe and describe how seeds and bulbs grow into mature plants - find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	- I know that plants have a life cycle. - I know that plants start out as bulbs or seeds. - I know that we have to take care of plants in order for them to grow. - I know that plants need water, light and heat to survive. - I know why plants grow better in spring and summer than in winter. - I know that plants change and grow over time.	- I know that plants have a life cycle. - I know that plants start out as bulbs or seeds. - I know that we have to take care of plants in order for them to grow. - I know that plants need water, light and heat to survive. - I know why plants grow better in spring and summer than in winter. - I know that plants change and grow over time.	Seeds, bulbs, water, light, temperature, growth.	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 to the processes 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.
Summer Term 2 Everyday materials	- compare how things move on different surfaces. - find out how the shapes of solid objects made from some materials can be changed by squashing, bending,	- I know that the properties of a material make it best suited for a particular job. - I know how to explain what material I would use for an object based on it's properties. - I know that some materials are mouldable through squashing, bending, twisting or stretching.	- How does the shape of an object impact it's ability to move across a surface? - Why is it important some materials are mouldable and some aren't?	Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, waterproof, absorbent, opaque, transparent,	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



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	twisting and stretching	- I know that some materials are not flexible. - I know that the shape of an object can help it move across a surface.		brick, paper, fabrics, squashing, bending, twisting, stretching, elastic, foil.	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 areas, and recording their observations.
--	-------------------------	---	--	---	---

Essential Knowledge in the Lower Key Stage Two Science Curriculum – Cycle B

Term	National Curriculum Expectations	Substantive Knowledge	Learning Questions	Key Vocabulary	Working Scientifically
Autumn Term 1	- recognise that they need light in order to see things and that dark is the absence of light - notice that light is reflected from surfaces - recognise that light from the sun can be dangerous and that	- I know that we see through reflections of different surfaces. - I know that light travels in straight lines. - I know that there are natural and man-made sources of light. - I know that light travels into the eyes. - I know that shadows are caused when an object blocks light.	- How does light travel into my eyes? - What are the differences between natural and man-made light sources? - How are shadows formed? - Why do shadows change in length	Light, shadows, mirror, reflective, dark, reflection.	Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.



	there are ways to protect their eyes - recognise that shadows are formed when the light from a light source is blocked by an opaque object - find patterns in the way that the size of shadows change.	- I know that shadows will change in length throughout the day. - I know that I need to protect my eyes from the sun.	throughout the day? - How can I protect myself from the sun? - Why is light important?		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: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.
Autumn Term 2	Identify that humans have and some other animals have skeletons and muscles for support	- I know what a skeleton is. - I know that our skeleton is used for 3 main reasons: protection, movement and support. - I know that tendons connect muscles to bones. - I know that ligaments connect bones to bones. - I know that our skeleton can be broken and needs care. - I know which organs our skeleton protects.	- Why is the skeleton important to our body? - Do all animals have skeletons? - Are all skeletons inside animals bodies? - How do our bones and muscles join together? - Which organs are protected by our skeleton? - How do I care for my skeleton to keep it healthy?	Movement, muscles, bones, skull, nutrition, skeletons, ligaments, tendons	Pupils should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. Pupils might work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons.
Spring Term 1	- Identify that animals need the right type of nutrition. - Understand that animals cannot make	- I know the roles that food, water and air play in our survival. - I know what the word diet means. - I know that there are different food groups.	- What do animals need to survive? - Why is nutrition important?	Animals, humans, nutrition, food, diet,	Pupils should continue to learn about the importance of nutrition. Pupils might work scientifically by: They might compare and contrast the diets of different animals (including their pets)



	their own food and they get their nutrition from what they eat.	- I know that animals get their nutrition from what they eat. - I know why a balanced diet is important. - I know whether different foods are considered healthy or unhealthy and why. - I know what will happen if I eat too many unhealthy foods.	- What is meant by a balanced diet? - Why is it important to maintain a balanced diet? - What are the different food groups that we use? - How do all animals maintain a healthy diet? - Do I have a healthy diet?	grouping, healthy.	and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out.
Spring Term 2	- 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	- I know that there are different styles of habitat. - I can talk about different habitats in my local environment - I know that classification involves grouping animals together based on similar characteristics. - I know that vertebrates are animals with a backbone. - I know that invertebrates are animals without a backbone. - I can name different habitats around the world. - I know that habitats change depending on the environment and climate. - I know that humans pose a danger to different habitats.	- Why are there different habitats? - What habitats are there in my local area? - Why are different habitats suited to different parts of the world? - How can we group animals due to their characteristics? - What dangers do humans pose to different habitats? - How do plants and animals adapt to	Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, snails, slugs, worms, spiders, insects, environment, change, danger, living things.	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.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

		I know that habitats are changing and animals are having to adapt to this.	the habitat they are in?		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 to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.
Summer Term 1	- identify how sounds are made, associating some of them with something vibrating - recognise that vibrations from sounds travel through a medium to the ear - find patterns between the pitch of a sound and features of the object that produced it - find patterns between the volume of a sound and the strength of the	- I know that sounds are caused by vibrations. - I know that molecules in the air are vibrating and travel to my ears. - I know that this causes tiny hairs in my ears to vibrate. - I know these hairs are connected to nerves that send messages to the brain. - I know that these vibrations travel through the air into my ears. - I know that the pitch of a sound is how high or low the sound is. - I know that the volume of sound is how loud the sound is.	- What causes sounds? - How do I hear things through my ears? - How does the size of an object impact it's pitch? - What is causing a sound to have a greater volume? - Does speed always travel at the same speed? - Which materials provide the best	Volume, vibration, wave, pitch, tone, speaker.	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 earmuffs 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.



	vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases.	- I know the pitch of a sound will be higher on smaller or tighter objects. - I know that the speed of sound is slower than the speed of light. - I know that sound travels at different speeds through solids, liquids and gases. - I know that sounds will get fainter the further I am from the sound.	insulators of sound?		
Summer Term 2	- 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.	- I know the 3 states of matter are solids, liquids and gases. - I know that solids hold their shape. - I know that liquids take the form of the object they are in. - I know that gases will escape from a container. - I know how to label objects as solids, liquids or gases based on their properties - I know that when a gas turns into a liquid it is called condensation. - I know when a liquid turns into a gas it is called condensation. - I know when a liquid turns into a solid it is called freezing. - I know that the water cycle involves evaporation and condensation - I know the temperature at which water changes to solid is 0 degrees. - I know that the temperature at which water changes to gas is 100 degrees.	- What are the characteristics of the 3 states of matter? - How can I decide if something is a solid liquid or gas? - What different states of matter do I see in everyday life? - How can objects change from one state of matter to another? - What role do evaporation and condensation play in the water cycle? - How does temperature impact the state of an object?	Solid, liquid, gas, evaporation, condensation, particles, temperature, freezing, heating.	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, for example, 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). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

- I know that different materials change state at different temperatures.

period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.

FOUNDED 1691



Essential Knowledge in the Upper Key Stage Two Science Curriculum – Cycle B

Term	National Curriculum Expectations	Substantive Knowledge	Learning Questions	Key Vocabulary	Working Scientifically
Autumn Term 1	• compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and	• I know that materials have different properties. • I know that electrical conductivity allows electricity to move through an object. • I know that different materials are suited to different needs. • I know how to explain properties of different materials. • I am able to suggest which materials should be used for different purposes.	• How can I classify materials based on their properties? • What materials are best used in different circumstances? • How can choosing the correct material keep us safe?	Hardness, solubility, transparency, electrical conductivity, magnet, response, thermal conductivity, materials, wood, plastic.	Pupils might work scientifically by: carrying out tests to answer questions, for example, '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?' They might compare materials in order to make a switch in a circuit.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	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	- I know how to perform an experiment to separate materials. - I know how to keep a test fair by controlling variables.	- How can I separate materials based on their properties? - Which materials would be best used to stop an ice cream from melting in the summer? - How can I use results to control an experiment?		
Autumn Term 2	- Understand name the main parts of the circulatory system - Describe the functions of the heart, blood vessels and blood - Describe the ways in which nutrients and water are transported within animals including humans.	- I know blood is pumped around the body by the heart - I know that blood moving around our body is called the circulatory system. - I know that veins take blood to the heart. - I know that arteries take blood away from the heart. - I know that blood is to the body through the pulmonary artery. - I know that blood is oxygenated in the lungs. - I know blood returns to the heart through the pulmonary vein. - I know oxygenated blood is pumped out through the aorta - I know that blood travels around the body delivering oxygen and nutrients.	- What is the circulation system? - What does my heart look like? - How does blood move around my body? - What role do the lungs play in the circulation system? - How does a healthy diet support the circulation system? - Why do we need oxygenated and	Circulatory, heart, blood, vessels, veins, arteries, oxygenated, deoxygenated, valve, nutrients, water, transportation, animals, humans.	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. .



		- I know that rich, fatty foods can clog arteries and veins - I know that exercise can help remove fatty deposits from my body.	deoxygenated blood? How does exercise impact the circulation system?		
Spring Term 1	- 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.	- I know that electricity is measured in volts. - I know how to construct different circuits using components including; switches, bulbs, buzzers, cells and wires. - I can describe the direction that current is travelling in. - I know the difference between a series and parallel circuit. - I know how to control when a bulb is turned on or off. - I recognise how the number of volts in a circuit will increase the brightness of the bulb. - I know when series or parallel circuits are used. - I can explain the benefits and downfalls of a series or parallel circuit. - I can draw circuits using the correct symbols for components. - I know which materials will make good conductors or insulators. - I know how to keep safe using electricity.	- How do I construct a simple circuit? - How can I represent a circuit using key symbols? - Which is better to use: a series or parallel circuit? - How can the position of components impact that brightness of a bulb? - When are materials used as conductors or insulators? - How can you keep safe when using electricity?	Cells, wires, bulbs, switches, buzzers, battery, circuit, series, conductors, insulators, amps, volts.	Building on their work in year 4, pupils should construct simple series circuits, to help them to 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. Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.



Spring Term 2	Describe the changes as humans develop to old age.	- I know the different stages of a life cycle. - I know how our body changes as we grow older. - I know how bodies change during puberty. - I know that boys and girls go through similar and different changes. - I know how to keep clean during puberty. - I know that human baby takes 40 weeks to develop in the womb. - I know that different animals have different gestation periods.	- How do different animals reproduce? - How are gestation periods different for different animals? - How does our body change as we grow older? - What is puberty? - What is the importance of good hygiene through puberty? - What changes will take place as I move through old age?	Foetus, embryo, womb, gestation, baby, toddler, teenager, elderly, growth, development, puberty.	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 could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.
Summer Term 1	- 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	- I know that light travels into my eye in a straight line. - I know that I can use reflection to see in different directions. - I know the different parts of the eye. - I know that when a light hits an object it reflects back off the object at the same angle. - I can draw a diagram representing how light is reflected	- How do I see objects? - What role do different parts of my eye play in me being able to see? - How does light reflect off surfaces? - How can I use reflection to help	Refraction, reflection, light, spectrum, rainbow, colour	Pupils should build on the work on light 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 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. They might investigate the relationship between light sources, objects and shadows by using shadow puppets.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes - use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	- I know that smooth, shiny surfaces reflect light better than rough, dull surfaces. - I know transparent objects let light through. - I know translucent object let some light through. - I know opaque objects do not let any light through. - I know that refraction involves the bending of light. - I know why we have different colours within a rainbow.	me see things I can't directly see? - What is refraction of light? - Why are there different colours of light within rainbows?		They could extend their experience of light by looking 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).
Summer Term 2	- 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	- I know that the Earth is millions of years old. - I know what the theory of evolution is. - I know that different types of animals were on the Earth millions of years ago. - I understand that adults pass on characteristics to their offspring. - I know that I have characteristics similar to my parents. - I know that there are inherited characteristics and environmental characteristics. - I know that inheritance takes place across all animals. - I know that we all have genes that are individual to us.	- What is Darwin's theory of evolution? - How have animals changed over time? - Why do I look like my parents? - Which shapes us more as a person inherited or environmental characteristics? - How do animals adapt to the environment around them?	Fossils, adaptation, evolution, characteristic s, reproduction, genetics.	Building on what they learned 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



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

	identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	- I know what adaptation is. - I know that all animals have to adapt to the environment they are in. - I know that adaptations and habitats are linked together.	How are adaptation and evolution linked?		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.
--	--	--	--	--	--

Links To Research

Publication	Selected Recommendations	How are we applying these to our Curriculum?
Finding the optimum: the science subject report - GOV.UK (www.gov.uk) Published: 02/02/2023	The 2 important aspects of science in which pupils need to build their understanding throughout their time at school. Substantive knowledge: refers to the established knowledge produced by science, for example, the parts of a flower or the names of planets in our solar system. This is referred to as 'scientific knowledge' and 'conceptual understanding' in the national curriculum. Disciplinary knowledge: refers to what pupils learn about how to establish and refine scientific knowledge, for example by carrying out practical procedures. By identifying and sequencing this knowledge, it is possible to plan in the curriculum for how pupils will get better at working scientifically throughout their time at school.	- The curriculum plans are focused on the children's progression through these two different types of knowledge. - Our substantive knowledge is highlighted within our curriculum plans and helps teachers to focus on the key knowledge children will know from that lesson. We recognise that this needs to be progressive across the different scientific aspects. The curriculum plan highlights this progression looking at how we develop children's knowledge throughout their time in school. - Our disciplinary knowledge looks at how we use skills within science lessons to help children develop their substantive knowledge. We aim to provide an engaging curriculum that stimulates children's learning and develops their ability to question and analyse why things happen.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

<i>Research review series: Science (Ofsted 2021)</i> accessed from: https://www.gov.uk/government/publications/research-review-series-science/research-review-series-science#curriculum-progression-what-it-means-to-get-better-at-science	• Teachers, teaching assistants and technicians have access to high-quality subject-specific CPD to develop subject knowledge and pedagogical content knowledge. This is aligned to the curriculum. • In primary schools, there is at least one teacher who specialises in teaching science and science leaders have dedicated leadership time. • Timetables allocate appropriate teaching time to science, reflecting its status as a core subject in the national curriculum. There are particular concerns that pupils in some primary schools are not receiving sufficient curriculum time to learn science. • Pupils have access to sufficient practical resources to take part in demanding practical work, either independently or in appropriately sized groups that enable first-hand experiences.	• The science coordinator and teachers undertake regular CPD through courses and staff meetings. The science coordinator has dedicated leadership time to support CPD. • In Key Stages 1 and 2, children have science lessons for an hour a week. • In EYFS, children have regular opportunities to access science through Knowledge and Understanding of the World teacher-led inputs and science-based star challenges that children access as part of their enhanced provision. • Children have regular access to practical resources in lessons, with a dedicated budget for the science curriculum to update and replenish resources as and when necessary.
<i>The 10 Key Issues with children's learning in Primary Science in England (March 2021)</i> Accessed from:	• Children should develop a deep understanding of the big ideas in science. • Children should process and build on their prior learning.	• Our curriculum has been carefully planned with great consideration of "why this? Why now?" to ensure it is sequential, allows for the development and progression of skills and is appropriate to class topics if possible.



Brown's C of E Primary School, Horbling

Caring. Learning. Enjoying. Achieving within the love of God

https://www.scienceacrossthecity.co.uk/wp-content/uploads/2021/03/3634_Childrens_Learning_in_Primary_Science_Report_2020_v8.pdf

- Children's science learning should be challenging.
- Practical work in science should be purposeful.
- Children should have regular and repeated opportunities to develop skills in science.

- Pre and post-tests are undertaken at the start and each of each unit in science. This aids formative assessment, guiding differentiation in lessons, and interventions if appropriate.
- Scientific enquiry skills are regularly referred to in our *Super Science* starters so children know what skills they will be using in that lesson. There are regular opportunities to write in science in order for children to explain how they carried out a scientific enquiry and what they discovered.
- Our curriculum ensures full National Curriculum coverage and regular opportunities to work scientifically and develop scientific skills.

