



Bramcote Hills Primary School
'Make the future better for all'



Curriculum Depth Map - Science

Intent:

At BHPS we provide children with a challenging and engaging science curriculum that encourages children to be inquisitive. The Science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living. We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. Throughout their study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills.

We aim to build on key scientific *knowledge*, understanding and **skills**. We ensure that skills for working scientifically are built-on and developed, so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions and be curious about their surroundings.

Implementation:

We motivate and enthuse pupils by creating deep links with other curriculum areas including maths, science, history, art and SMSC. Wherever possible, we use first-hand experiences and aim to provide a purposeful, engaging high-quality science education that provides pupils with the foundations for understanding the world. So much of science lends itself to outdoor learning and so we provide pupils with opportunities to experience this. Through various workshops, trips and interactions with experts, children have the understanding that science has changed our lives and that it is vital to the world's future prosperity.

Our science curriculum is designed to allow children time to think, discuss, practise, explore and embed. This allows time for teaching, practice and repetition - both in a year group and across both key stages. Curriculum coverage is mapped out carefully from EYFS to Year 6 which allows some key concepts to be developed at a deeper level of learning, understanding and mastery. Fundamental *knowledge* and **skills** are covered at key points throughout the primary phase and repeated to allow pupils to build on what has been taught before. Where year groups are covering an area in more depth, this will be highlighted in green on the Curriculum Depth Map below. Lessons will be planned and a knowledge organiser provided for pupils, which outlines the area to be taught, where the new knowledge and skills fit in with their prior learning, any sticky knowledge they need to understand and key vocabulary they need to learn. As we draw our pupils from a wide catchment, some of our children come from a scientific background (we have children whose parents have links with Nottingham University and the Queens Medical Centre) and already have some understanding of the specific disciplines of biology, chemistry and physics. These children are encouraged to study concepts in more depth, through independent study and through supporting others, explaining their thinking and linking ideas rationally.

Impact:

Impact is evidenced through:

- Pupils' use and understanding of the identified scientific vocabulary
- Retaining key knowledge
- Demonstrating that they know more all the time
- Low-stakes tests/quizzes
- Pupils will be able to express their knowledge and understanding
- The use and outcomes of the varied activities
- High aspirations, which will see them through to further study, work and a successful adult life; particularly girls
- Children who have a genuine love of science and a thirst for scientific knowledge.

Key Stage One

Year 1	Year 2
<p>Plants</p> <p>Animals, including humans</p> <p>Everyday materials.</p> <p>Seasonal changes.</p>	<p>Living things and their habitats (desert & polar)</p> <p>Plants</p> <p>Animals including humans</p> <p>Uses of everyday materials</p>
Biology: Animals including Humans	
<p>Identify and name a variety of common fish, amphibians, reptiles, birds, mammals.</p>	<p>Understand that animals, including humans, have offspring, which grow into adults - introduced to the processes of reproduction and growth in animals - focused on growth, rather than how reproduction occurs.</p>
<p>Identify and name a variety of carnivores, herbivores and omnivores</p>	<p>Find out about and describe the basic needs of animals, including humans, for survival (water, food, air).</p>
<p>Describe and compare the structure of common animals (fish, amphibians, reptiles, birds and mammals, including pets) by how they look and how they move</p>	<p>Describe the importance for humans of exercise.</p>
<p>Identify, name, draw and label the basic parts of the human body (head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.</p>	<p>Describe the importance for humans of eating the right amounts of different types of food - nutrition</p>
<p>Say which part of the body is associated with the five senses, using them to compare different textures, sounds and smells.</p>	<p>Describe the importance for humans of hygiene.</p>
<p>Describe how to take care of animals in their local environment and the need to return them safely after study.</p>	
<p>Compare and contrast animals, describing how they could group them (i.e. what they eat)</p>	
Biology: Plants	
<p>Identify and name a variety of common wild and garden plants including deciduous and evergreen trees</p>	<p>Observe and describe how seeds and bulbs grow into mature plants in the local environment throughout the year.</p>
<p>Identify and describe the basic structure of common flowering plants (blossom, roots, stem, leaves, flowers, petals, bulb, seed)</p>	<p>Describe how plants need water, light and the right temperature to grow and stay healthy - seeds and bulbs need water to grow but most do not need light.</p>
<p>Identify and describe the structure of trees (leaves, blossom, branches, trunk, fruit, roots, seed)</p>	<p>Begin to understand the requirements of plants for germination, growth and survival, as well as the processes of reproduction and growth in plants.</p>
<p>Observe the growth of flowers, plants and/or vegetables over the course of the year.</p>	
<p>Compare and contrast familiar plants, describing how they would identify and group them.</p>	
<p>Recording the life cycles of plants and how plants change throughout the year.</p>	
Biology: All Living Things	
	<p>Explore and compare the differences between things that are living, dead and things that have never been alive</p>
	<p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other</p>
	<p>Identify and name different plants and animals in their habitats, including micro habitats</p>
	<p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain and identify and name different sources of food.</p>
	<p>Identify that all living things have certain characteristics that are essential for keeping them alive and healthy.</p>
	<p>Observe how living things in the local habitat depend on one another as a source of food and shelter.</p>
	<p>Compare animals in familiar habitats with animals found in less familiar habitats.</p>

Chemistry: Everyday Materials	
<i>Distinguish between an object and the material from which it is made</i>	<i>Identify and compare the suitability of a variety of everyday materials including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses so that some materials are used for different objects and that different materials are used for the same object.</i>
<i>Identify and name a variety of everyday materials including wood, plastic, glass, metal, water, and rock (and brick, paper, fabric elastic, foil)</i>	Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
Describe the simple physical properties of a variety of everyday materials (hard/soft, stretchy/stiff, shiny/dull, rough/smooth, bendy, waterproof, absorbent, opaque/transparent), with opportunities to explore and ask questions of the materials and properties (What is the best material for a ____?)	<i>Research inventors that have developed useful new materials, like, John Dunlop, Charles Macintosh, John McAdam or Elon Musk.</i>
Compare & group together a variety of everyday materials on the basis of their simple properties	<i>Develop their understanding of sustainable / unsustainable materials for particular purposes.</i>
Physics: Seasonal Change	
Observe changes across the four seasons (taught over the course of the year).	
Observe and describe weather associated with the seasons and how the day length varies, taught over the course of the year.	
Working Scientifically	
Can ask simple questions and recognise that they can be answered in different ways	Can ask simple questions and recognise that they can be answered in different ways
Observe closely using simple equipment.	Observe closely using simple equipment.
Perform simple tests.	Perform simple tests.
Identify and classify.	Identify and classify.
Use their observations and ideas to suggest answers to questions including using simple secondary sources (internet, books, visitors).	Use their observations and ideas to suggest answers to questions including using simple secondary sources (internet, books, visitors).
Gather and record data to help in answering questions, noticing patterns and relationships with support.	Gather and record data to help in answering questions.
Can begin to use simple scientific language when saying what they have done and what they have found out when suggesting answers to questions [with help].	Can begin to use simple scientific language when saying what they have done and what they have found out when suggesting answers to questions [with help].

Key Stage Two

Year 3	Year 4	Year 5	Year 6
Plants Animals, including humans Rocks Light Forces and magnets	Living things and their habitats Animals including humans States of Matter Sound Electricity	Living things and their habitats. Properties and Changes of Materials Earth and Space Forces	Animals, including humans Light Electricity Living things and habitats (classification) Evolution and Inheritance
Biology: Animals Including Humans			
Identify that animals including humans need the right types and amount of nutrition and that they cannot make their own food; they get nutrition from what they eat.	Explore what damages teeth and how can we / animals look after them	Describe the changes as humans develop to old age.	Describe the ways in which nutrients and water are transported in animals including humans.
Identify that humans and some other animals have skeletons and muscles for support, protection and movement - research how different parts of the body have special functions.	Compare the teeth or carnivores and herbivores and suggest reasons for differences.	Draw a timeline to indicate the stages in the growth and development of humans, including puberty.	Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
Identifying and comparing animals without skeletons and observing their movement.	Identify and name the parts of the human digestive system and explore questions to understand their special functions.	Research the gestation periods of other animals and compare them to humans - recording length and mass of baby as it grows.	Identify and name the parts of the human circulatory system and describe the functions of the heart, blood vessels and blood.
Compare and contrast the different diets of animals, as well as different food groups.	Identify and know the different types of human teeth and know the simple functions of different human teeth.		Describe how to keep bodies healthy and how they can become damaged - including how some use of drugs and other substances can be harmful.
	Use and construct food chains to identify producers, predators and prey.		
Biology: All living things and their habitats			
	Recognise that living things (animals, flowering plants, non-flowering plants) can be grouped in different ways.	Know the life cycle of different living things e.g. mammal, amphibian, insect and bird and compare their life cycles.	Give reasons for classifying plants and animals in a specific way.
	Explore and use classification keys to help group, identify and name living things in their local and wider environment and begin to group vertebrates and invertebrates.	Know the process of reproduction in plants and in animals, including sexual and asexual reproduction in plants and sexual reproduction in animals.	Classify living things into broad groups according to observable characteristics and based on similarities and differences including micro-organisms, plants and animals.
	Recognise that environments can change and that this can sometimes pose dangers to living things, including the human impact on them (positive and negative)	Throughout the year, observe the local environment and life cycle changes in a variety of living things.	Broad groupings like microorganisms, animals and plants can be subdivided.

	Study the local environment throughout the year to observe plants and animals in their local habitat - how does it change throughout the year?	Research the work of naturalists and animal behaviourists like David Attenborough and Jane Goodall.	Give reasons why living things are classified in one group and not another.
		Investigate how plants can grow (seeds, stems, root cuttings, tubers, bulbs).	Research about the significant work of Carl Linnaeus.

Biology

Plants			Evolution and Inheritance
Know the function of different parts of flowering plants and trees.			Know how the Earth and living things have changed over time and how fossils can be used to find out about the past.
Explore the requirements of plants for life and growth and how they vary from plant to plant (air, light, water, nutrients from the soil, and room to grow).			Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents - characteristics are passed on from parents).
Investigate the way in which water is transported in plants.			Know how animals and plants are adapted to suit their environment in different ways and that adaption may lead to evolution. - giraffe's necks have become longer.
Explore the part that flowers play in the life cycle of flowering plants including pollination, seed formation, and seed dispersal.			Consider how different breeds of dogs have evolved, including when different breeds produce offspring.
Explore the role of the roots and stem in the plant's nutrition and support, leaves for nutrition and flowers for reproduction.			Research the work of Charles Darwin and Alfred Wallace's work on evolution and link back to the work of Mary Anning.
Know that plants can make their own food - don't need to understand how it happens.			

Chemistry

Rocks	States of Matter	Properties & changes in materials	
Compare and group rocks based on their appearance and physical properties, giving reasons. Look at local examples.	Compare and group materials together according to whether they are solids, liquids or gases.	Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets (linked to years 3&4).	
Know how fossils are formed when things that have lived are trapped within rock - links made to Mary Anning.	Observe that some materials change state when they are heated or cooled and measure or research the	Know and explain how a material dissolves to form a solution and know and show how to recover a substance from a solution.	

	temperature at which this happens in degrees Celsius.		
Know how soil is made with rocks and organic matter.	Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating).	
Compare and contrast different types of soils.	Develop descriptions of the states of matter (solids hold their shape, liquids form pools, gases escape from unsealed containers).	Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.	
Investigate what happens when rocks are left in water / rubbed together.	Observe water as a solid, liquid and a gas, describing the differences when it is cooled or heated.	Know and demonstrate that some changes are reversible and some are irreversible.	
		Know how some changes result in the formation of a new material and that this is usually irreversible including changes associated with burning and the action of acid on bicarbonate of soda. Research how chemists create new materials, for example, Spencer Silver and Ruth Benerito.	

Physics: Forces

Know about and describe how objects move on different surfaces.		Explore falling objects and raise questions about the effects of air resistance.	
Know how some forces require contact and some do not, giving examples.		Observe how different objects like parachutes and sycamore seeds fall.	
Know about and explain how magnets attract and repel.		Identify and know the effect of air and water resistance on an object.	
Predict whether magnets will attract or repel and give a reason.		Explore the effects of friction on movement and investigate how it slows or stops objects.	
Compare and order everyday materials on the basis of whether they are attracted to a magnet or not.		Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.	
Describe how magnets have two poles and explore the behaviour and everyday uses		Explain how levers, pulleys and gears allow a smaller	

of different types of magnets.		force to have a greater effect	
		Research how Galileo and Isaac Newton helped develop the theory of gravitation.	

Physics: Light

Explore what happens when light reflects off a mirror or other reflective surface.			Recognise that light appears to travel in straight lines and 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 dark is the absence of light and that light is needed in order to see and is reflected from a surface.</i>			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.
<i>Know about the danger of direct sunlight / bright lights and describe how to keep protected.</i>			Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that shadows change.			Investigate the phenomena such as rainbows, colours on soap bubbles and objects looking bent in water (refraction)

Physics: Electricity

	Identify and name appliances that require electricity to function.		Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer
	Construct a series circuit and identify and name the components in a simple circuit (including cells, wires, bulbs, switches and buzzers) to create a simple device.		Compare and give reasons for why components work and do not work in a circuit e.g. brightness of bulbs, volume of buzzers, and on/off positions of switches.
	Predict and test whether a lamp will light within a circuit.		Draw circuit diagrams using correct symbols
	Know the function of a switch and link this to a simple series circuit.		Systematically identify the effect of changing one component at a time in a circuit.
	Know the difference between a conductor and an insulator; giving examples of each.		Create series circuit to create a useful tool, such as a traffic light, burglar alarm, etc.
	Draw a circuit as a pictorial representation - not necessarily using conventional circuit symbols.		
	Taught about the precautions for working safely with electricity.		

	Observe patterns and trends when creating simple series circuits.		
	Physics: Sound	Physics: Earth & Space	
	<i>Know how sound is made, associating some of them with vibrating - explore and identify how sound is made in a range of musical instruments.</i>	<i>Know about and explain the movement of the Earth and other planets relative to the Sun.</i>	
	<i>Recognise that vibrations from sounds travel through a medium to the ear.</i>	<i>Know about and explain the movement of the Moon relative to the Earth.</i>	
	<i>Know the correlation between pitch and the object producing a sound and how it can be changed.</i>	Describe the Sun, Earth and Moon (using the term spherical).	
	<i>Know the correlation between the volume of a sound and the strength of the vibrations that produced it.</i>	<i>Know and demonstrate how night and day are created, and the apparent movement of the Sun across the sky.</i>	
	<i>Know what happens to a sound as it travels away from its source</i>	Understand that the sun is a star and it has 8 planets, while a moon is a celestial body that orbits a planet. Research how ideas about the solar system have changed over time, understanding how the geocentric model of the solar system gave way to the heliocentric model given the work of Ptolemy, Alhazen and Copernicus.	

Working Scientifically

Year 3		Year 4	
Ask questions such as: Where does a fossil come from?	Use a thermometer to measure temperature and know there are two main scales used to measure temperature	Ask questions such as: Why are steam and ice the same thing? Why is the liver important in the digestive systems? What do we mean by 'pitch' when it comes to sound?	Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
Observe at what time of day a shadow is likely to be at its longest and shortest	Gather and record information using a chart, matrix or tally chart, depending on what is most sensible	Use research to find out how much time it takes to digest most of our food	Group information according to common factors e.g. materials that make good conductors or insulators
Observe which type of plants grow in different places	Group information according to common factors e.g. plants that grow in woodlands or plants that grow in gardens	Use research to find out which materials make effective conductors and insulators of electricity	Use bar charts and other statistical tables (in line with Year 4 mathematics statistics) to record findings
Use research to find out how reflection can help us see things that are around the corner	Use bar charts and other statistical tables (in line with Year 3 mathematics statistics) to record findings	Carry out tests to see, for example, which of two instruments make the highest or lowest sounds	Present findings using written explanations and include diagrams, when needed
Use research to find out what the main differences are between sedimentary and igneous rocks	<i>Know how to use a key to help understand information presented on a chart</i>	Set up a fair test with more than one variable e.g. using different materials to cut out sound	Write up findings using a planning, doing and evaluating process
Test to see which type of soil is most suitable when growing two similar plants	Present findings using written explanations and include diagrams when needed	<i>Explain to others why a test that has been set up is a fair one</i>	<i>Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned</i>
Set up a fair test with different variables e.g. the best conditions for a plant to grow	<i>Make sense of findings and draw conclusions which help them to understand more about scientific information</i>	Measure carefully (taking account of mathematical knowledge up to Year 4) and add to scientific learning	<i>When making predictions there are plausible reasons as to why they have done so</i>
<i>Explain to a partner why a test is a fair one</i>	Amend predictions according to findings	Use a data logger e.g. to check on the time it takes ice to melt to water in different temperatures	Able to amend predictions according to findings
Measure carefully (taking account of mathematical knowledge up to Year 3) and add to scientific learning	<i>Be prepared to change ideas as a result of what has been found out during a scientific enquiry</i>	Use a thermometer to measure temperature and know there are two main scales used to measure temperature	<i>Be prepared to change ideas as a result of what has been found out during a scientific enquiry</i>

Working Scientifically

Year 5		Year 6	
Ask questions such as: Why does the moon appear as different shapes in the night sky? Why do shadows change during the day?	Able to present information related to scientific enquiries in a range of ways including using IT	Know which type of investigation is needed to suit particular scientific enquiry e.g. looking at the relationship between pulse and exercise	Use a range of written methods to report findings, including focusing on the planning, doing and evaluating phases
Set up an investigation when it is appropriate	Use diagrams, as and when necessary, to support writing	Set up a fair test when needed e.g. does light travel in straight lines?	Clear about what has been found out from their enquiry and can relate this to others in class
Set up a fair test when needed e.g. which surfaces create most friction?	Is evaluative when explaining findings from scientific enquiry	Know how to set up an enquiry based investigation e.g. what is the relationship between oxygen and blood?	Explanations set out clearly why something has happened and its possible impact on other things
Set up an enquiry based investigation	Clear about what has been found out from recent enquiry and can relate this to other enquiries, where appropriate	Know what the variables are in a given enquiry and can isolate each one when investigating	Aware of the need to support conclusions with evidence
Know what the variables are in a given enquiry and can isolate each one when investigating	Explanations set out clearly why something has happened and its possible impact on other things	Justify which variable has been isolated in scientific investigation	Keep an on-going record of new scientific words that they have come across for the first time and use these regularly in future scientific write ups
Use all measurements as set out in Year 5 mathematics (measurement), including capacity and mass	Able to give an example of something focused on when supporting a scientific theory	Use all measurements as set out in Year 6 mathematics (measurement), including capacity, mass, ratio and proportion	Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class
Use other scientific instruments as needed e.g. thermometer, rain gauge, spring scales (for measuring Newtons)	Keep an on-going record of new scientific words that they have come across for the first time	Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs	Able to give an example of something they have focused on when supporting a scientific theory
Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs	Able to relate causal relationships when, for example, studying life cycles	Make accurate predictions based on information gleaned from their investigations and create new investigations as a result	Frequently carry out research when investigating a scientific principle or theory
Make predictions based on information gleaned from investigations	Frequently carry out research when investigating a scientific principle or theory	Able to present information related to scientific enquiries in a range of ways including using IT	
Create new investigations which take account of what has been learned previously			

Appendix - Key Knowledge and Vocabulary

Science - KS1				
Key Vocabulary				
question	identify	diagram	contrast	
answer	classify	chart	describe	
observe	sort	map	biology	
observing	group	data	chemistry	
equipment	record	compare	physics	
Key Knowledge		Key Vocabulary		
Year 1				
Everyday Materials <ul style="list-style-type: none"> <input type="checkbox"/> Materials are what an object is made from. <input type="checkbox"/> Hard things are not easily broken or bent. <input type="checkbox"/> Soft things are easy to cut, fold or change the shape of. <input type="checkbox"/> Stretchy things can be pulled longer or wider without breaking. <input type="checkbox"/> Shiny things reflect light. <input type="checkbox"/> Dull things don't look shiny. <input type="checkbox"/> Rough things feel uneven and bumpy. <input type="checkbox"/> Smooth things have no lumps or bumps. <input type="checkbox"/> Waterproof things keep water out. <input type="checkbox"/> Absorbent things soak up water. <input type="checkbox"/> Transparent objects can be seen through. <input type="checkbox"/> Opaque objects can't be seen through. 		material wood plastic glass metal water rock properties	hard soft stretchy stiff shiny dull rough smooth	bendy waterproof absorbent brick paper fabrics elastic foil transparent opaque
Animals including Humans <ul style="list-style-type: none"> <input type="checkbox"/> Amphibians live in the water as babies and on land as they grow older. They have smooth, slimy skin. <input type="checkbox"/> All birds have a beak, two legs, feathers and wings. Some birds don't fly. <input type="checkbox"/> Fish live and breathe under water. They have scaly skin, fins to help them swim and they breathe through gills. <input type="checkbox"/> Mammals are animals that breathe air, grow hair or fur and feed on their mother's milk as a baby. <input type="checkbox"/> All reptiles breathe air. They have scales on their skin. <input type="checkbox"/> Animals that mostly eat other animals (meat) are carnivores. <input type="checkbox"/> Animals that only eat plants are herbivores. <input type="checkbox"/> Animals that eat both plants and other animals are omnivores. <input type="checkbox"/> Some animals have common body parts (e.g. legs, mouths, ears) and some have different body parts e.g. trunk, beak, wings. <input type="checkbox"/> Some animals live in the wild, some can be kept as pets. <input type="checkbox"/> Humans have 5 senses and there are basic body parts associated with each one - sight (eye), hearing (ears), touch (skin), taste (tongue) and smell (nose) 		fish amphibians reptiles birds mammals pets carnivores herbivores omnivores meat plants human mouse dog cow wild pet	penguin chicken seagull robin goldfish tuna shark eel snake tortoise lizard alligator frog toad newt	salamander arms hearing sight touch taste smell eyes ears skin tongue nose neck
Seasonal Changes <i>(taught throughout the year)</i> <ul style="list-style-type: none"> <input type="checkbox"/> In the UK we have four seasons: spring, summer, autumn and winter. Summer is the hottest season and winter the coldest. <input type="checkbox"/> The weather changes in each of the seasons. <input type="checkbox"/> Seasons change throughout the year because of the way the Earth travels around the Sun. <input type="checkbox"/> In summer the days are longer and in winter they are shorter. 		season spring summer autumn winter weather hot/warm cool/cold	sun/sunny cloud/cloudy wind/windy rain/rainy snow/snowing hail/hailing sleet frost	fog/mist ice/icy rainbow thunder lightning storm light/dark day/night

Plants

- ❑ Some plants grow in the wild and some are planted in gardens and parks.
- ❑ Deciduous trees have broad, flat leaves which fall off in winter.
- ❑ Evergreen trees have hard leaves or needles that stay on the trees all year.
- ❑ Roots take in water and nutrients from the soil.
- ❑ The stem holds the plant up and carries the water and nutrients from the roots to the leaves and flowers.
- ❑ Leaves catch sunlight to make energy.
- ❑ Flowers attract insects and birds.
- ❑ Petals are the colourful part of the flower.
- ❑ Fruit contains the plant's seeds. Sometimes humans try to grow fruit without seeds because it's easier to eat.
- ❑ Seeds and bulbs grow into new plants.

wild plants	tree	clover
garden plants	trunk	daffodil
deciduous	root	rose
evergreen	branches	lavender
root	leaf	sunflower
nutrients	oak	flowers
stem	ash	ivy
leaf	sycamore	
petals	willow	
buds	beech	
fruit	pine	
bulbs	fir	
seed	dandelion	
vegetable	daisy	
environment	buttercup	
blossom	nettle	

Science - KS1			
Key Vocabulary			
question	identify	diagram	contrast
answer	classify	chart	describe
observe	sort	map	biology
observing	group	data	chemistry
equipment	record	compare	physics
Key Knowledge		Key Vocabulary	
Year 2			
Uses of Everyday Materials <ul style="list-style-type: none"> <input type="checkbox"/> Materials are chosen for objects because they have certain properties. <input type="checkbox"/> Materials can be used for more than one thing and different materials can be used for the same thing. <input type="checkbox"/> Wood is hard, stiff, strong and opaque. It can be carved into different shapes. <input type="checkbox"/> Metal is strong, hard <input type="checkbox"/> Glass is a hard, waterproof, transparent material that can be made in many shapes. It is often used to make windows and bottles. <input checked="" type="checkbox"/> Plastic is used to make many of the things we use in everyday life. It is waterproof and strong. It can be made rough or smooth, flexible or rigid and can be made into different colours. <input type="checkbox"/> Rock is a natural material. It is strong, hard and often used for building. <input type="checkbox"/> Paper and cardboard is made from trees or by recycling. Paper is light and flexible but cardboard is strong and stiff. <input type="checkbox"/> The shapes of some solid objects made from certain materials can be changed by squashing, bending, twisting and stretching. 		hard stiff strong man-made natural rough smooth transparent opaque waterproof flexible rigid clay recycling solid John McAdam John Dunlop Charles Macintosh metal plastic wood glass brick rock paper cardboard rubber fabric squashing bending twisting stretching	
Animals, Including Humans: Healthy Living <ul style="list-style-type: none"> <input type="checkbox"/> All animals, including humans, have offspring which grow into adults. <input type="checkbox"/> All animals, including humans, need food, water and air to stay alive. <input type="checkbox"/> All foods contain nutrients which your body needs to stay active throughout the day. <input type="checkbox"/> Everyone should have their '5 a day'-5 portions of fruit and vegetables, to get the right amount of nutrients. <input type="checkbox"/> It's important not to eat too much sugar and fat. Sugary foods are bad for your teeth and can be fattening, and foods with lots of fat are bad for year heart. <input type="checkbox"/> Keep your mouth healthy by brushing your teeth for two minutes twice a day. <input type="checkbox"/> It's important to have 30-60 minutes of exercise every day. This can include running around and playing games with friends. <input type="checkbox"/> To stop illness and infections spreading, we must be hygienic and keep ourselves clean. 		offspring grow adults develop life-cycle live young nutrition reproduce survival water food air healthy diet proteins carbohydrates fat vitamins dairy hygiene infection germs exercise egg-chick-chicken egg-caterpillar-pupa-butterfly spawn-tadpole-frog lamb-sheep baby-toddler-child-teenager-adult	

<p>Living Things and Their Habitats</p> <ul style="list-style-type: none"> ❑ Some things are living, some things are dead and some things have never been alive. ❑ All living things move, respire (breathe), sense, grow, reproduce, excrete and feed (nutrition) (MRS GREN) ❑ A habitat is a place that an animal lives. It provides the animal with food, water and shelter. ❑ There are many different sorts of habitats and micro-habitats around the world from forests to grasslands and from mountain slopes to deserts. ❑ Most living things are suited to living in a habitat e.g. camels have long lashes to keep out sand. ❑ A food chain shows how each animal gets its food. Food chains are one of the ways that animals depend on each other to stay alive. 	<p>habitat microhabitat rivers woodland ponds sea rainforest desert polar leaf litter seashore ocean shelter conditions species</p>	<p>healthy living dead never alive food food chain hot/warm/cold dry/damp/wet bright/shade/dark nutrition respiration senses reproduction excretion</p>
<p>Plants</p> <ul style="list-style-type: none"> ❑ If they are given the right conditions, seeds and bulbs grow into mature plants. ❑ Seeds and bulbs have a store of food inside them. ❑ Seeds and bulbs need water to germinate. ❑ Most plants need light from the sun to grow well. ❑ Plants make their own food in their leaves using sunlight. ❑ Some plants like cooler temperatures and some like warmer temperatures. ❑ A food chain shows how animals depend on other plants and animals for their food and survival. ❑ In a food chain, there are some living things that produce energy (producers) and some that use the energy (consumers). 	<p>water light suitable temperature grow healthy germination nutrition sprout shoot polar grassland</p>	<p>seed dispersal life cycle seeds bulbs conditions mature photosynthesis supplies carnivore omnivore herbivore</p>

Science - KS2			
Key Vocabulary			
relevant questions	thermometer	labelled diagrams	differences
scientific enquiry	data logger	keys	similarities
comparative and fair test	gather	bar charts	change
systematic	record	tables	evidence
careful observation	classify	oral and written explanations	improve
accurate measurements	present	conclusion	construct
secondary sources	drawings	predictions	interpret
Key Knowledge		Key Vocabulary	
Year 3			
Animals including humans: Muscles & Skeletons <ul style="list-style-type: none"> <input type="checkbox"/> That humans cannot make their own food. They get their nutrition from what they eat. <input type="checkbox"/> That humans have skeletons and muscles for support, protection and movement. <input type="checkbox"/> Know that the body parts have special functions. <input type="checkbox"/> Know the names of the body parts associated with skeleton and muscles. <input type="checkbox"/> Compare the diets of different groups of animals, including humans. <input type="checkbox"/> Know what a healthy meal looks like. 		vitamins nutrition skull minerals skeleton brain fat muscles ribs protein diet heart carbohydrates joint lungs fibre pelvis movement water cartilage pull support rib cage contract protection tendon relax spine	
Rocks <ul style="list-style-type: none"> <input type="checkbox"/> Rocks have been used by humans for millions of years, from early tools and weapons through to construction materials for modern buildings. <input type="checkbox"/> Sediment deposited over time, often as layers at the bottom of lakes and oceans, forms sedimentary rocks. <input type="checkbox"/> Extreme pressure and heat over time forms metamorphic rocks. Examples are marble and slate. <input type="checkbox"/> When magma cools and solidifies it forms igneous rock. Examples are granite and pumice. 		fossil soil crystals sedimentary metamorphic igneous organic matter iron steel	
Magnets <ul style="list-style-type: none"> <input type="checkbox"/> The Earth is a very big magnet. Its North and South poles are highly magnetic. <input type="checkbox"/> A magnet always has north and south poles. Cutting a magnet in half makes two magnets, each with two poles. <input type="checkbox"/> Magnets only attract certain types of metals, other materials such as glass, plastic and wood aren't attracted 		magnetic pole surface attract magnet repel magnetic force north push south pull metal open	
Light <ul style="list-style-type: none"> <input type="checkbox"/> Black and dark objects absorb light and heat whilst white or light objects reflect it. <input type="checkbox"/> Some objects like glass are transparent which means that light can shine through them. <input type="checkbox"/> Our main source of light on Earth comes from the Sun. A ray of light travels very fast. <input type="checkbox"/> Darkness is made by blocking light from the sun or some other source of light, which makes shadows. <input type="checkbox"/> The Sun, other stars, fires, torches and lamps all make their own light and so are examples of sources of light. <input type="checkbox"/> A mirror is not a source of light, it merely reflects light. <input type="checkbox"/> Some animals are nocturnal. They are awake at night and can see very well in the dark. Our eyes aren't designed to see at night. 		reflection light Sun shadows see Moon light source dark artificial opaque surface torch refraction natural candle periscope star lamp nocturnal convex translucent orbits concave transparent	

Plants

- Trees are more than just part of our natural landscape. They provide shelter and food for wildlife.
- Trees absorb carbon dioxide and produce breathable air.
- A large tree can consume 100 gallons of water out of the ground in one day.
- Not only do trees provide shade in the summer, but they serve as a windbreak in the winter too.
- Trees are able to communicate and defend themselves against attacking insects.
- Know the part that flowers play in the life cycle of a flowering plant.
- Know about pollination, seed formation and seed dispersal.

flowering
plants
roots
stem
trunk
leaves
flowers
nutrition
support

reproduction
makes own
food
air
light
water
nutrients
soil
fertiliser

flowers
pollination
seed
formation
seed dispersal

Science - KS2			
Key Vocabulary			
accurate measurements	cycle	keys	scientific enquiry
bar charts	data logger	labelled diagrams	secondary sources
careful observation	differences	model	sensor
change	drawings	oral/written explanations	similarities
classify	evidence	predictions	systematic
comparative and fair test	gather	present	tables
conclusion	improve	process	thermometer
conclusions	interpret	record	variable
construct	investigation	relevant questions	
Key Knowledge		Key Vocabulary	
Year 4			
States of Matter (including The Water Cycle) <ul style="list-style-type: none"> <input type="checkbox"/> Materials can be grouped into solids, liquids and gases. <input type="checkbox"/> Solids, liquids and gases are described by observable properties: <ul style="list-style-type: none"> • Solids retain their shape unless a force is applied to them, for example to cut or shape them. They have constant volume because the particles making up the solid are held in a tight structure where they can vibrate but cannot move in relation to each other. • Liquids take the shape of the container they are in but do not change in volume. The surface of a liquid will remain horizontal when the container is tipped. The particles in a liquid remain in contact with each other so the liquid cannot be compressed, but they are more loosely bound and so can move in relation to each other, allowing changes of shape. Liquids form a pool not a pile. • Gases change in shape and volume to fill the space they are in and escape from an unsealed container. The particles in a gas are wide apart and move freely so, under pressure, the gas will take up less space. <input type="checkbox"/> Heating causes some solids to melt into liquids and some liquids to evaporate into gases (the rate of evaporation is associated with temperature). Cooling causes some gases to condense into liquids and some liquids to freeze into solids. <input type="checkbox"/> Any pure substance has characteristic temperatures at which it freezes (its freezing point which, for most materials, is the same temperature as its melting point) or boils (boiling point). <input type="checkbox"/> Water can naturally exist in three forms on Earth: liquid (water), solid (ice) or gas (water vapour). 		air boil/ boiling point change of state compress condense/ condensation cooled/cooling crystals degrees Celsius (°C) evaporate/ evaporation expand flow freeze freezing point gas grain/granular heat/heating ice/water/steam lava liquid matter melt/melting point molten oxygen particle pour powder precipitation solid/solidify states of matter substance temperature viscous volume water (vapour)	
Animals including Humans <ul style="list-style-type: none"> <input type="checkbox"/> Describe the simple functions of basic parts of the digestive system. <input type="checkbox"/> Identify different types of teeth in humans and their simple functions. <input type="checkbox"/> Construct and interpret a variety of food chains, identifying producers, predators and prey. 		predator prey producers	

<p>Sound</p> <ul style="list-style-type: none"> ❑ Sounds travel in all directions from a source, including above and below, round corners and through materials. ❑ Sounds are caused by a material vibrating ❑ Sounds actually travel more easily through a solid than through a liquid or a gas because the particles in a solid are packed more closely together so it is easier for the vibration to be passed on. ❑ Sounds can be high or low. This is known as the pitch of the sound. ❑ The loudness of a sound is dependent on how strong the vibrations are. The size of these vibrations is known as the amplitude ❑ Sounds become fainter as you move away from the sound source; as the vibrations pass through the air away from the sound source they become weaker. ❑ Sound is a form of energy that transfers in a longitudinal wave ❑ Our ear drums vibrate in a similar way to the original source of the vibration, allowing us to hear many different sounds. 	<p>amplitude auditory brass cochlea fainter frequency gas hammer high inner ear instrument insulation insulation liquid loud low middle ear muffle</p>	<p>noise outer ear particles percussion pitch quiet solid sound sound source strings travel tune tuned instrument vibrate vibrations volume wave woodwind</p>
<p>Living things and their habitats:</p> <ul style="list-style-type: none"> ❑ Living things can be classified (grouped) in different ways according to their characteristics. ❑ Nutrients produced by plants move to primary consumers then to secondary consumers through food chains. ❑ An animal that is eaten by another is called prey and an animal that kills & eats other animals is called a predator. ❑ Environments can change and that this can sometimes pose dangers to living things. ❑ Environmental change affects different habitats differently. ❑ Different organisms are affected differently by environmental change. ❑ Human activity significantly affects the environment. 	<p>amphibians animals classification consumers deforestation environment(al) fish flowering food chain/web habitat human impact</p>	<p>invertebrate mammals nature reserves non-flowering organisms plants predator prey producers reptiles vertebrates</p>
<p>Electricity</p> <ul style="list-style-type: none"> ❑ Electricity is a type of energy that can build up in one place to flow to another. ❑ A source of electricity (mains or battery) is needed for electrical appliances to work. ❑ Electricity can be generated by power stations, wind, the sun, water and even from animal poo! ❑ Electricity sources push electricity around a circuit. ❑ A circuit must be complete for electricity to flow and devices to work; switches can be used to control this flow. ❑ Some materials allow electricity to flow easily and these are called conductors (metals are good conductors). Materials that don't allow electricity to flow easily are called insulators. ❑ More batteries will push the electricity round the circuit faster. ❑ When an electric charge builds up on the surface of an object it makes static electricity. This is why we sometimes have a small electric shock. 	<p>appliance battery bulb buzzer cells circuit closed component conductor danger (dis)connect electrical electrical safety electricity electron filament flow glass</p>	<p>insulator mains metal motor negative open plastic plug positive power rechargeable rubber series circuit socket solar switch symbol wire</p>

Science - KS2			
Key Vocabulary			
plan	scientific diagrams	report	refute
variables	labels	present	arguments
measurements	classification	conclusions	identify
accuracy	keys	casual relationships	classify
precision	tables	explanations	describe
repeat	predictions	degree of trust	patterns systematic
record	further comparative	oral and written evidence	quantitative-measurements
data	fair tests	support	
Key Knowledge		Key Vocabulary	
Year 5			
Forces <ul style="list-style-type: none"> <input type="checkbox"/> Frictional force is any force that is caused due to friction. An example of this might be when you put on the brakes on your bike. <input type="checkbox"/> Gravity is the pulling force acting between the Earth and a falling object, for example when you drop something. Gravity pulls objects to the ground. <input type="checkbox"/> Surface resistance is the force on objects moving across a surface, such as an ice-skater skating on ice. <input type="checkbox"/> Any kind of force is really just a push or a pull. <input type="checkbox"/> Air resistance is the force on an object moving through air, such as a plane moving through the sky. Air resistance affects how fast or slowly objects move through the air <input type="checkbox"/> Water resistance is the force on objects floating on or moving in water. <input type="checkbox"/> Magnetic force is an invisible force created by electrons, which controls magnetism and electricity. 		fall gravity force air resistance water resistance friction moving surfaces Newton Galileo mechanisms levers pulleys gears magnetic force magnet attract parachute	
Earth & Space <ul style="list-style-type: none"> <input type="checkbox"/> Know about and explain the movement of the Earth and other planets relative to the Sun. <input type="checkbox"/> Know about and explain the movement of the Moon relative to the Earth. <input type="checkbox"/> Know and demonstrate how night and day are created. <input type="checkbox"/> Describe the Sun, Earth and Moon (using the term spherical). <input type="checkbox"/> Know information about the planets. <input type="checkbox"/> Earth is the third planet from the sun and the only world known to support an atmosphere with free oxygen, oceans of liquid water on the surface, and life. 		Earth planets Sun solar system Moon celestial body sphere/spherical rotate/rotation Mercury Venus Mars Jupiter Saturn Uranus Neptune Pluto orbit revolve spin night and day	
Living Things and their Habitats <ul style="list-style-type: none"> <input type="checkbox"/> In general, the life cycles of plants and animals have three basic stages including a fertilised egg or seed, immature juvenile, and adult. However, some organisms may have more than three life cycle stages, and the exact names of each stage can slightly differ depending on the species. <input type="checkbox"/> Know the life cycle of different living things, e.g. mammal, amphibian, insect and bird. <input type="checkbox"/> Know the differences between different life cycles. <input type="checkbox"/> Know the process of reproduction in plants. <input type="checkbox"/> Prepare and explain a timeline, to indicate stages of growth in humans. 		Sexual asexual mammal, amphibian, insect, bird plants animals vegetable garden flower border rainforest oceans, desert similarities differences germination pollination stamen stigma reproduction	

<p>Properties and changes of materials</p> <ul style="list-style-type: none"> ❑ Know what a reversible change means. ❑ Know what an irreversible change means. Irreversible changes, like burning, cannot be undone. Reversible changes, like melting and dissolving, can be changed back again. ❑ Mixtures can be separated out by methods like filtering and evaporating. A change is called irreversible if it cannot be changed back again. ❑ 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 	<p>solubility transparency conductive response to magnets dissolve liquid solution solute separate separating solids, liquids, gases translucent rusting residue condensing</p>	<p>properties hardness filtering sieving evaporating reversible changes mixing evaporation filtering sieving melting irreversible conductivity insulation chemical opaque</p>	<p>air oxygen powder grain/granular crystals ice/water/steam water vapour heated/heating cooled/cooling temperature degrees Celsius melt freeze solidify melting point molten boil</p>
<p>Animals including Humans</p> <ul style="list-style-type: none"> ❑ Describe the changes as humans develop to old age. ❑ Explain the 5 stages of growth; infancy, toddler, childhood, adolescence, adulthood. ❑ Describe the gestation periods of humans and other animals. 	<p>puberty gestation classification precision reproduction teenager obese toddler embryo</p>		

Science - KS2

Key Vocabulary - Working Scientifically

plan	scientific diagrams	report	refute
variables	labels	present	arguments
measurements	classification	conclusions	identify
accuracy	keys	casual relationships	classify
precision	tables	explanations	describe
repeat	predictions	degree of trust	patterns systematic
record	further comparative	oral and written evidence	quantitative-measurements
data	fair tests	support	

Key Knowledge

Key Vocabulary

Year 6

Light

- Light travels in straight lines. Because of this, objects are seen because they give out or reflect light into the eye.
- Know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- Light travels in straight lines and therefore shadows have the same shape as the objects that cast them.
- Rainbows are formed when the sun shines through water particles (transparent) and when white light passes through, it 'bends' and splits into the range of colours which make white light (Refraction)

- | | |
|--------------|-------------|
| light wave | shadow |
| light source | opaque |
| concave | transparent |
| convex | translucent |
| filters | reflective |
| lens | materials |
| retina | refraction |
| cornea | |
| iris | |
| pupil | |
| shiny | |
| dull | |
| reflection | |

Classification

- In about 350 B.C. Aristotle (a Greek philosopher) classified all things into 4 main groups.
- Today we use 7 different levels of classification.
- Scientists have now divided living things into five larger groups called Kingdoms.
- Be able to classify living things into broad groups according to observable characteristics and based on similarities and differences.
- Know how living things have been classified.
- Give reasons for classifying plants and animals based on specific characteristics
- Research about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.

- | | | |
|-------------------|--------------------|----------------|
| Linnaeus | breeding | fungus |
| Darwin | environment | mushrooms |
| Wallace | fossil | keys |
| Anning | reproduction | environment |
| micro-organism | selective breeding | fish |
| natural-selection | ancestors | amphibians |
| classification | endangered | reptiles birds |
| vertebrates | extinct | |
| invertebrate | organism | |
| mammals | | |

Evolution and Inheritance

- Charles Darwin was an English Victorian scientist who is famous for his contributions to the science of evolution. He proposed that all life has descended over time from common ancestors.
- Alfred Wallace was an English Victorian scientist who is famous for his contributions to the science of evolution. He jointly founded the concept of natural selection with Charles Darwin.
- Evolution is a scientific theory used by biologists. It explains how living things changed over a long time, and how they have come to be the way they are.
- We know that living things have changed over time, because we can see their remains in the rocks.

- | | | |
|-----------------|-----------------|-----------|
| adapted/ | fossils | syndrome |
| adaptation | genes | variation |
| ancestors | hominid | genetic |
| aquatic | inheritance | diversity |
| characteristics | natural | |
| chromosomes | selection | |
| Charles Darwin | offspring | |
| Evolution | palaeontologist | |
| evolved | | |

<ul style="list-style-type: none"> ❑ Fossils provide information about living things that inhabited the Earth millions of years ago ❑ Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents due to their genetics and characteristics. ❑ Animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
<p>Animals including humans</p> <ul style="list-style-type: none"> ❑ The heart, blood and blood vessels make up the human circulatory system. ❑ The heart is a muscle and pumps blood around the body. ❑ The blood vessels carry blood around the body ❑ Blood is made up of different components: plasma, platelets, white blood cells, red blood cells. ❑ Blood can be either oxygenated or de-oxygenated. ❑ Blood is transport in a circuit around the body: heart to lungs, lungs to heart, heart to body, body to heart. ❑ The heart has 2 large chambers called ventricles. ❑ The heart has 2 smaller chambers called atria. ❑ The aorta is the blood vessel taking blood from the heart to the body. ❑ The word 'pulmonary' means 'lungs' ❑ Describe the ways in which nutrients and water are transported within animals, including humans. 	<p>circulatory system heart blood blood vessels pumps oxygen carbon dioxide lungs oxygenated deoxygenated</p>	<p>atria cardiovascular capillaries pulse ventricles veins pulmonary</p>	<p>diet exercise drugs nutrients water lifestyle</p>
<p>Electricity</p> <ul style="list-style-type: none"> ❑ Know that the brightness of a bulb is associated with the voltage. ❑ Compare and give reasons for variations in how components function. ❑ Use recognised symbols when representing a simple circuit in a diagram. ❑ Construct simple series circuits. ❑ Be able to answer questions about what happens when they try different components, for example; switches, bulbs, buzzers and motors. 	<p>conductor insulator component communicate diagram sign symbol convention conventional</p>	<p>series circuit parallel circuit device electricity cell open switch closed switch terminal</p>	<p>circuit positive negative pole current switch battery</p>